

FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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EDITORIAL COMMENT.



It hardly required much deep thought to safely prophesy that air raids would materialise commencing with the end of January and through part of February. So the fully expected has but happened during last week-end and by way of starting the present week. The main objective was naturally regarded as England, the spleen of the Huns never being so gratified as when "strafing" their much-adored British cousins. It was just as well in one way, however, that the courtesies of the marauders were extended to Paris by way of a preliminary canter. This has brought home to the public on this side of the Channel very directly the fact that all the drastic comparisons of the perfect organisation of the air defences of the French capital, with the negligence displayed in the protection of London against the Zep. pirates, have not been justified—provided favourable opportunity for attack presented itself. No doubt in the past the counter irritants prepared by us for the inflictions

The
Raiding
Season.

forced upon us by the German airships have not been of the highest order. But neither had experience been obtained of the necessities of the situation created. Things are, however, now upon a different footing. To this fact we have probably to look for the reason of the wider sphere of operations over England which Monday night's raid inaugurated. Taking chances when you know the limited extent of your risk, is being done all the time in the various phases of the war, but the German air-raiders have not hitherto positively wallowed in the delight of taking chances when they have believed the odds have been unfavourable to a successful return home. In fact, quite the contrary. The journeys across have been made at wonderfully well-judged times, and being satisfied that they have attained what they set out to do, the method of operations of the raiders has been to hustle back to their home shores at the greatest possible speed and height attainable. Were their excursions of the legitimate military order, there would be nothing to advance against such tactics. But as things are, such procedure savours more of the burglar climbing down the water spout upon the first sign of discovery, than the action of an honourable foe, who has consummated a brave act of war in a creditable manner, for which no one would honour him more than the enemy against whom the attack had been directed. The night visits to Paris have thoroughly roused the contempt of our Allies to the murderous habits of the soldiers of the Kaiser, and there is a lively demand in many quarters for reprisals. And the idea is quite good provided there are sufficient machines to permit this return of courtesies, without interfering with the military demands upon the services of the flying escadrilles. To detach, however, any appreciable number of aircraft from their more legitimate rôle for such reprisals would be, we think, a profound mistake. The more so from the fact that the re-organisation of the French air service is in course of completion, and to bring in side-issues of this character just now would hardly tend to the smoothing out of the knotty problems which have necessitated the re-shuffling of our allies' military flying arrangements. Without question, the most important policy of all is persistent attack upon the homes of the Zeppelins. As to reprisals, from experience of German

psychology, provided the machines can be spared, and as nothing else would appear to touch their moral sense, it might be advisable to give this method a thorough trial. Where the weakness of both Paris and London defence lies is that neither of us are in the position to fight the aggressors with their own weapons, that is by mobile dirigibles. The moment we are able to pit properly-equipped airship against airship, we shall hear little more of air attacks over capital cities. From this aspect of the use to which their Zeppelins can be put, the Germans have, it must be admitted, scored. But what civilised nation could ever have contemplated the perpetration of such iniquities as have been carried out by the Huns under the cloak of waging civilised war? From this point of view our Government are hardly to be blamed, as, regarding the leviathan Zeppelins merely as engines of attack under civilised military conditions, they had little faith in their use as fighting units, and preferred—and rightly too—to pin their faith to the more mobile aeroplane. Had it been realised that the Zeppelins could have been put to such base uses, we do not doubt but that proper provision would have been made in good time to nullify the kindly intentions of this barbaric nation. But the question is, ought not the authorities to have realised years ago, from the fact that the Germans continued to build these dirigibles with such persistency, that there were objects other than legitimate ones for which they were to be employed? In the columns of "FLIGHT" their construction was advocated for this very reason, and there is little excuse, therefore, for the parsimonious policy in not risking a few hundred thousands, so as to have been prepared for any eventuality that might occur. Our power to retaliate in kind and also to fight airship for airship, or even in more favourable ratio, would have had a very wholesome reaction upon the intentions of the Zeppelinites and this country would have been spared the consequences of the many nocturnal raids, which help to hearten the German public so much, however cold and implacable they may leave our own people. Even at this late hour, is there any reason why we should not be able to make up leeway in this connection? It is inconceivable that we cannot either build or procure airships sufficiently efficient to make it less worth while the Germans venturing their own aircraft other than in their proper sphere of scouting, and sea-scouting chiefly at that. We believe not; in fact, we could put the authorities upon the track of a batch of strafers, if they are possessed of any enterprise and imagination. The difficulties in the way of fighting airships with aeroplanes are of a very substantial order. When to these difficulties is added night in its blackest form, the complications of the problem scarcely need elaboration. There are, however, some weaknesses in our defence organisation which require a little light letting in upon them. Whilst quite appreciating the impossibility at the present time of patrolling the whole coast line continuously—a handicap which week by week should become less—there is a happy medium, and it does appear to be unfortunate, to put it as mildly as possible, that when daylight attacks are made at points already fully equipped for defense and offense, it should find us so unready as to enable the enemy pilots to effect

their will upon us for the best part of half an hour or so and then get clear away.

The reality of the dangers attaching to the Zeppelin raids is appreciated apparently, judging by the result of the interview which a deputation of Members of Parliament—amongst whom, by the way, we were glad to notice Mr. Warwick Brookes, the newly-elected Mile End candidate—had last week with Lord Kitchener and the First Lord of the Admiralty. We trust that the great improvement in London's anti-aircraft arrangements announced at that meeting may prove its worth in good time. It was, perhaps, but a sign of the times that it emerged during the reply of the Ministers to the deputation, that in the common task of organising the defence "the War Office and the Admiralty had worked most harmoniously together." If aviation is the means of bringing about such a blessed state of affairs as this foreshadows, truly the nation will have another huge obligation to aviation for which it must be thankful. Maybe the creation presently of the Third Service—ultimately to be the First—*will* be the solution of the aloofness of the two services one to the other. The air service, upon a proper foundation, might easily become common ground upon which the other two could learn to understand and know each other a little better.

♦ ♦ ♦

"We have Maintained Our Supremacy."

In these words the official despatch from the British General Headquarters in France, dated at 9.30 p.m. on January 25th, concludes its message. The reference follows the statement that "aircraft on both sides have been active." Whether these very gratifying words were penned without any ulterior view or not we are ignorant, but it is well that so emphatic an announcement should have been made at the moment, as it figuratively puts the official seal to the remarks which we found it necessary to make last week in regard to "the deadly Fokker" stunt which appeared to have got most of the ha'penny press in its toils. By some curious coincidence, since our strictures upon this Fokker boom appeared, the whole fabrication seems to have fizzled out, and the Fokker may for all intents and purposes never have been. However undesirable these sort of scare campaigns may be, it may be that they bring about a lively interest in closely allied directions, and associated as the "deadly peril" apparently was with the advocacy of the air candidate's election for the Mile-end constituency, in this particular instance it may have effected some little good by drawing more particular attention to the desirability of our maintaining our supremacy in the air. Mr. Pemberton-Billing may certainly lay good claim to having by his fight thoroughly roused up the members of the House to their individual responsibility for seeing that the air service is not relegated to a minor position. It is fairly reasonable to ascribe to this Parliamentary contest the bringing about of the deputation to Lord Kitchener. It is still more certain that to the election programme of Mr. Pemberton-Billing is due the keen interest which his opponent, Mr. Warwick Brookes, took in aviation during the contest and since he was elected. Whatever "P.-B." may determine to do in the future as to Parliamentary honours, he may well be satisfied that his efforts have not been in vain. He has made it more than ever patent that success in war, not only in the future but in the present, is likely to be greatly influenced if not governed by supremacy in the air.



The coming of Britannia's Third Service and "Supremacy in the Air." From an original drawing by Tom Morgan

The British Air Service

"PER ARDUA AD ASTRUM"

UNDER this heading are published each week the official announcements of appointments and promotions affecting the Royal Naval Air Service and the Royal Flying Corps (Military Wing) and Central Flying School. These notices are not duplicated. By way of instance, when an appointment to the Royal Naval Air Service is announced by the Admiralty it is published forthwith, but subsequently, when it appears in the LONDON GAZETTE, it is not repeated in this column.

Royal Naval Air Service.

THE following appeared among the Admiralty announcements of the 25th ult. :—

Temporary Lieut.-Commander (R.N.V.R.) J. S. Douglas, to "President," additional, for R.N.A.S. To date Jan. 24th.

The following appeared among the Admiralty announcements of the 26th ult. :—

Flight Lieut. R. J. J. Hope Vere, appointed Acting Flight-Commander, with seniority of Jan. 24th.

Flight Sub-Lieuts. R. H. Mulock and G. H. Beard, both promoted to Flight-Lieutenant, with seniority of Jan. 1st.

Temporary Flight Sub-Lieut. F. G. D. Hards, promoted to Temporary Flight-Lieutenant, with seniority of Jan. 1st.

The undermentioned have been entered as Probationary Flight Sub-Lieutenants (temporary), with seniority as follows, and all appointed to "President," additional, for R.N.A.S. : M. H. Stephens, A. E. E. Blackburn, G. H. Burland, C. Butterworth, W. McN. Gray, and P. G. McNeil, all Dec. 30th; B. P. Chase, C. W. Spencer, P. H. Hepburn, N. Wallis, and N. H. Fletcher, all Jan. 25th.

J. A. M. Allan entered as Probationary Flight Sub-Lieutenant (temporary), with seniority of Jan. 25th, and appointed to "President," additional, Jan. 29th.

C. O. Palmer, J. A. V. Echevarri, J. E. Maxwell, and W. R. Abbott, all entered as Temporary Sub-Lieutenants (R.N.V.R.), with seniority of Jan. 25th, and appointed to "President," for R.N.A.S., Jan. 27th.

Temporary commissions have been granted as follows: P. G. Burton as Lieutenant (R.N.V.R.), with seniority of Jan. 25th; and B. M. Dodds, as Sub-Lieutenant (R.N.V.R.), with seniority of Jan. 26th, and both appointed to "President II," additional, for R.N.A.S.

Petty Officer C. F. S. Smith (R.N.V.R.), granted a temporary commission as Sub-Lieutenant with seniority of Jan. 24th, and appointed to "President," additional, for R.N.A.S.

The following appeared among the Admiralty announcements of the 27th ult. :—

Temporary Lieut. (R.N.V.R.) W. A. Daniell, entered as Probationary Flight Sub-Lieutenant (temporary), with seniority of Jan. 26th, and appointed to "President," additional, for R.N.A.S.

Temporary Sub-Lieut. (R.N.V.R.) W. H. Ralphs, promoted to Temporary Lieutenant, with seniority of Jan. 29th.

The following have been entered as Probationary Flight Sub-Lieutenants (temporary), with seniority of Jan. 29th, and all appointed to "President," additional, for R.N.A.S. : D. F. Ellis, J. R. Ross, H. Wild, T. G. Culling, G. M. F. O'Brien, L. H. Brett, and J. S. T. Fall.

C. R. Wylie, entered as Temporary Lieutenant (R.N.V.R.), with seniority of Jan. 26th, and appointed to "President II," for R.N.A.S.

The following appeared among the Admiralty announcements of the 29th ult. :—

Late Temporary Sub-Lieut. (R.N.R.) D. C. Woods, entered as Probationary Flight Sub-Lieutenant (temporary), with seniority of Jan. 26th, and appointed to "President," additional.

Royal Flying Corps (Military Wing).

THE following appeared in the *London Gazette* of the 25th ult. :—

Memorandum.—Lance-Corporal Arthur G. Brooke, from Northamptonshire Yeomanry (T.F.) to be Temporary Second Lieutenant for duty with the Royal Flying Corps. October 25th, 1915.

Supplementary to Regular Corps.—Second-Lieutenants (on probation) confirmed in their rank: William A. Harvey, Guy L. Godden, Edric Henty, Frank A. Garlick, Charles F. J. North, Edwin N. Layton, and George J. Williams.

To be Second Lieutenants (on probation): Jan. 21st, 1916; Denys K. Swarder, Eric H. Cooper, Charles Holland, Leonard A. Pricc, Paul Arbon, Alfred Gordon-Bond, Joseph M. Marks, Thomas G. Holmes, and John L. Horridge.

The appointment of Hyman Levy to a Second Lieutenantcy notified in the *Gazette* of December 23rd, 1915, is cancelled as from January 22nd, 1916.

The following appeared in a supplement to the *London Gazette* issued on the 26th ult. :—

Wing-Adjutant.—Temporary Capt. the Hon. W. C. W. Egerton, General List, vice Capt. A. Marshall, D.S.O., 28th Light Cavalry, Indian Army, and to retain his temporary rank whilst so employed. Dec. 1st, 1915.

Flying Officers.—Jan. 13th, 1916: Temporary Second-Lieut. G. A. Garveys-Gadd, R.A., and to be transferred to the General List. Temporary Second-Lieut. R. H. Peck, East Surrey Regt., and to be transferred to the General List. Second Lieut. W. R. D. Shaw, Essex Regt. (T.F.). Second Lieutenants Special Reserve: Guy L. Godden, William A. Harvey, Frank A. Garlick and Edric Henty.

Supplementary to Regular Corps.—The appointment of Harold M. MacCarthy to a Second Lieutenantcy, notified in the *Gazette* of Jan. 18th, 1916, is cancelled as from Jan. 21st, 1916.

The following appeared in a supplement to the *London Gazette* issued on the 27th ult. :—

Squadron-Commanders from Equipment Officers.—Dec. 15th, 1915: Temporary Major S. E. Smith, Gloucestershire Regt. (T.F.). And to be Temporary Majors whilst so employed: Capt. Archibald Christie, R.A.; Capt. Richard H. Collier, Special Reserve. From Flight-Commanders—Jan. 12th, 1916: Maj. David W. Powell, Northamptonshire Regt. And to be Temporary Majors whilst so employed: Capt. Augustus C. E. Marsh, R.A.; Lieut. (Temporary Capt.) Patrick H. L. Playfair, R.A.

Equipment Officers.—From Assistant Equipment Officers—Capt. R. Hall, Cheshire Regt., Special Reserve; Dec. 15th, 1915. Jan. 15th, 1916: Temporary Capt. C. G. Martyn, Monmouthshire Regt. (T.F.). Temporary Lieut. C. W. M. Ludgate, General List, and to be Temporary Captain whilst so employed.

Assistant Equipment Officers.—Second Lieut. S. R. Capon, King's (Liverpool Regt.) (T.F.); Dec. 23rd, 1915. Jan. 11th, 1916: Second Lieut. William H. Day, Hampshire Regt., and to be seconded. Temporary Second Lieut. G. M. Goode, Bedfordshire Regt., and to be transferred to the General List. Second Lieutenants, Special Reserve: Charles F. J. North, Edwin N. Layton, George J. Williams, and John T. Spittle.

Supplementary to Regular Corps.—To be Second Lieutenants (on probation): Cyril R. Huggins; Dec. 6th, 1915. Thomas L. Collins; Dec. 23rd, 1915. William C. Stringer; Jan. 3rd, 1916.

The following appeared in the *London Gazette* of the 28th ult. :—
Supplementary to Regular Corps.—Second Lieutenant (on probation) Wilfrid E. Marsden is removed from the Army, the King having no further occasion for his services; Jan. 29th, 1916.

To be Second Lieutenants (on probation): Stanley F. Vincent; Dec. 7th, 1915. Sydney F. Heard; Dec. 8th, 1915. P. C. Garratt; Jan. 1st, 1916.

The following appeared in a supplement to the *London Gazette* issued on the 29th ult. :—

Memoranda.—To be Temporary Second Lieutenants for duty with Royal Flying Corps: Pte. Eric L. Pearson, from Royal Warwickshire Regt.; Sept. 20th, 1915. Oct. 25th, 1915: Pte. Stanley F. Browning, from Royal Fusiliers (City of London Regt.). Sapper Wallace S. Earle, from 6th Field Co., 2nd Canadian Divisional Engineers. Gunner Lionel A. C. Herbert, from 17th Battery Canadian Field Artillery; Oct. 28th, 1915. Pte. Harold B. Hurst, from Royal Fusiliers (City of London Regt.); Nov. 15th, 1915. Pte. William F. L. Castle, from R.A.M.C. (T.F.); Nov. 17th, 1915. Lance-Corpl. Kenneth S. Henderson, from 5th Australian Light Horse; Nov. 25th, 1915. Pte. Thurstan F. Ba-sett-Smith, from Royal Sussex Regt. (T.F.); Dec. 6th, 1915. Dec. 7th, 1915: Corp. Aubrey E. S. Story, from R.E.; Sapper Alan A. Wilson-Walker, from 1st Field Co., Australian Engineers. Pte. Edwin I. Gibbons, from Royal Fusiliers (City of London Regt.); Dec. 20th, 1915. Dec. 28th, 1915: Gunner Charles E. W. Foster, from 1st Australian Field Artillery. Corp. John Goodlee, from 10th Australian Light Horse. Driver Norman R. Pomeroy, from R.F.A. (T.F.). Sergt. Lancelot L. Richardson, from 6th Australian Light Horse. Sergt. Richard G. Meech, from Motor Machine Gun Service, Canadian Artillery; Jan. 3rd, 1916. Pte. Ernest J. Radcliffe, from London Regt. (T.F.); Jan. 15th, 1916.

Supplementary to Regular Corps.—To be Second Lieutenants (on probation): Alfred de B. Brandon; Dec. 8th, 1915. Erl T. Williams, Gilbert S. Hall, Cecil W. Blain, Cecil H. Cox, and Michael H. Thunder; Dec. 13th, 1915.

THE ROLL OF HONOUR.

THE Secretary of the Admiralty announces the following casualty:—

Under date January 23rd:

Killed.

Probationary Flight Sub-Lieutenant Clinton G. Ward.

Correction:

Flight-Lieutenant James B. P. Ferrand, D.S.O., R.N., reported as missing on January 23rd, returned to duty on January 25th.

The following casualties have been reported from General Headquarters of the Expeditionary Force:—

Under date January 19th:

Previously Officially reported Missing, now Unofficially reported Killed.

Lieutenant E. F. W. Cobbold, Cheshire Regt., 7th Batt. (T.F.), and R.F.C.

Second Lieutenant S. Hathaway, Royal Flying Corps.

Second Lieutenant L. Kingdon, Worcestershire Regt. and R.F.C.

Previously Officially reported Missing, now Unofficially reported Wounded and Prisoners of War.

Lieutenant G. C. Formilli, R.G.A. and R.F.C.

Lieutenant K. W. Gray, 3rd Wiltshire Regt. and R.F.C.

Second Lieutenant H. T. Kemp, Cheshire Regt. and R.F.C.

Second Lieutenant W. E. Somervell, Loyal North Lancs. Regt. and R.F.C.

Previously Officially reported Missing, now Unofficially reported Prisoner of War.

Lieutenant A. L. Russell, Royal Flying Corps.

Died.

15714 2nd Class Air-Mechanic C. W. Roberts, Royal Flying Corps.

Under date January 20th:

Died of Wounds.

Second Lieutenant H. R. Johnson, Royal Flying Corps.

Wounded.

Lieutenant W. S. F. Johnson, Leicester Yeomanry and R.F.C.

Missing.

Second Lieutenant W. A. Brooking, R.F.A. and R.F.C.

Lieutenant C. B. Wilson, 10th Hussars and R.F.C.

Under date January 21st:

Wounded.

Captain G. A. K. Lawrence, D.S.O., R.F.A. and R.F.C.

Missing.

470 Sergeant N. V. Piper, Royal Flying Corps.

Undated:

Previously reported Missing, now reported Prisoner of War.

Captain G. T. Porter, R.F.A. and R.F.C.

The following casualty in the Indian Forces has been reported from the Mediterranean:—

Previously Officially reported Missing, believed Killed, now Unofficially reported Killed.

Second Lieutenant H. M. C. Lejger, Indian Army Reserve of Officers, attached R.F.C.

The following casualty in the Canadian Contingent with the Expeditionary Force is reported:—

Undated:

Previously Officially reported Missing, now Unofficially reported Killed.

Lieutenant C. V. G. Field, 4th Canadian Inf. Batt. attached R.F.C.

THE "X" AIRCRAFT RAIDS.

In view of the decision of the Government not to allow details of aircraft raids to be published, we are, as before, giving to each one an index number. Eventually, when details are available, we shall give the respective information under these index numbers, which will facilitate easy reference to each particular raid.

The following announcements have been officially issued:—

"X17" Raid, January 31st.

"War Office, 1.40 a.m., Feb. 1st.

"A Zeppelin raid by six or seven airships took place last night over the Eastern, North-Eastern, and Midland Counties. A number of bombs were dropped, but up to the present no considerable damage has been reported. A further statement will be issued as soon as practicable."

"6 p.m.

"The air raid of last night was attempted on an extensive scale, but it appears that the raiders were hampered by the thick mist. After crossing the coast the Zeppelins steered various courses, and dropped bombs at several towns, and in rural districts, in Derbyshire, Leicestershire, Lincolnshire, and Staffordshire. Some damage to property was caused. No accurate reports were received until a very late hour. The casualties notified up to the time of issuing this statement amount to 54 persons killed and 67 injured."

"7.55 p.m.

"Further reports of last night's raid show that the evening's air attacks covered a larger area than on any previous occasion. Bombs were dropped in Norfolk, Suffolk, Lincolnshire, Leicestershire, Staffordshire, and Derbyshire, the number being estimated at 220. Except in one part of Staffordshire, the material damage was not considerable, and in no case was any military damage caused. No further casualties have been reported, and the figures remain as 54 killed, 67 injured."

German Version.

Berlin, Feb. 1st.

"On the night of January 31st one of our naval airship squadrons dropped large quantities of explosives and incendiary bombs on the docks, harbour, and factories in and near Liverpool, on Birkenhead iron foundries and smelting furnaces, on Manchester factories, on smelting furnaces at Nottingham and Sheffield, and the great industrial works on the Humber and near Great Yarmouth. Everywhere marked effects were observed in gigantic explosions, and serious conflagrations. On the Humber a battery was also silenced. Our airships were heavily fired on from all directions, were not hit, and safely returned."

THE FLYING SERVICES FUND—ADMINISTERED BY THE ROYAL AERO CLUB.

THE Flying Services Fund has been instituted by the Royal Aero Club for the benefit of officers and men of the Royal Naval Air Service and the Royal Flying Corps who are incapacitated on active service, and for the widows and dependants of those who are killed.

The Fund is intended for the benefit of all ranks, but especially for petty officers, non-commissioned officers, and men.

Forms of application for assistance can be obtained from the Royal Aero Club, 166, Piccadilly, London, W.

Subscriptions.

	£	s.	d.
Total subscriptions received to Jan. 25th, 1916...	10,424	8	11
Collected at the Westland Aircraft Works, Yeovil (Seventeenth contribution) ...	0	11	2
Staff and Workers of Gwynnes, Ltd. (Eighth contribution) ...	10	5	10
Second Lieutenant C. S. Leaf (Second contribution) ...	1	1	0
Total, February 1st, 1916 ...	10,436	6	11

166, Piccadilly, W. B. STEVENSON, Assistant Secretary.

A "POPULAR" TYPE AEROPLANE DESIGN.

By C. M. POULSEN.

(Continued from page 77.)

IN our last week's instalment I made a ridiculous slip in the calculation of the wing loading, which I obtained by dividing the total weight of the machine by the *weight* instead of by the *area* of the wings. At the same time I take the opportunity to thank those readers who have written to me pointing out the slip. It is very gratifying to know that my suggested design is being so closely followed. The mistake, however, should not have occurred, and I apologise for making it, but it was, of course, obvious to anyone that it was a slip. In correcting it, when the total weight, 793 lbs., is divided by 250 instead of by 200 we get a loading of 3.17 lbs./sq. ft. which is below the 3.7 lbs. lift obtained at the minimum speed, so that the landing speed of our machine should be, if anything, below 35 m.p.h. Before we can be absolutely certain of obtaining the maximum speed of 65 m.p.h. we must find the total resistance of our machine at that speed. The resistance of the wings was estimated in our last issue to be about 85 lbs. at 95 ft./sec. (65 m.p.h.). There remains to find the resistance of all the other items.

The simplest way of doing this is to tabulate the various items and their resistance and vertical distance from the line of thrust, as by so doing we shall see whether there is formed a thrust-resistance couple. The different items, it will be seen, have been arranged in two tables, one for those that are within the slip stream and one for those outside it. The reason for dividing them up in this manner is that the items in the slip stream are exposed to a draught of slightly greater speed than the translational speed of the machine, and that this speed is practically constant for the whole speed range of the machine. With regard to the method of obtaining the resistance of the various items a few words may be of interest. In no case should these figures be taken as

absolutely correct, since with our present knowledge it is only possible to make an approximately accurate estimate.

Beginning with the table of parts in the slip stream we have a resistance of 9 lbs. for the body at a velocity of 95 ft./sec. This figure should be approximately correct. In the curve of resistance of the model B.F.36 dirigible the following formula for resistance was given. $R_T = 0.00091V^{1.25}$. Allowing for the fact that the body of our machine is octagonal instead of circular in section, I suggest taking a slightly higher figure, say $R_T = 0.001V^2$. This is, of course, quite an arbitrary value, but should, I think, be somewhere near the mark, slightly too high if anything. At 95 ft./sec. therefore the resistance of our *fuselage* will be $0.001 \times 95 \times 95 = 9$ lbs. The resistance of the engine is taken as 26.3 lbs. This may seem somewhat high, but in the absence of reliable figures one can only make a rough estimate, and I have preferred to keep the figure rather high in order to be on the safe side. Roughly speaking, the projected front area of the engine, engine plate, and propeller boss is 3 sq. ft. The resistance of an area of 3 sq. ft. moving normally through the air is found by the formula $R = 0.0015 AV^2$. Substituting we get $R = 0.0015 \times 3 \times 95 \times 95 = 40.5$ lbs. As, however, the engine is not a flat plate, we must multiply this figure with another expressing the ratio between the resistance of a flat plate and that of a body like our engine. For this purpose I suggest taking the resistance of the engine as 65 per cent. of that of a flat plate of the same area. We then obtain resistance of engine = $40.5 \times 65 = 26.3$ lbs.

We now come to consider the resistance of struts, and for this we have several results of tests on struts of different section made at the N.P.L. We shall choose one of a fineness ratio of 4-1 and of a certain section found at the N.P.L. to give a resistance of 0.0196 lbs. at a speed of 30 ft./sec. As the strut under test was 18 ins. long, the resistance per foot run at 30 ft./sec.

$$= \frac{0.0196 \times 12}{18} = 0.013. \text{ At 95 ft./sec. the resistance}$$

will be 0.13 lbs. per foot run. For the struts of the undercarriage the same figure has been retained since correction for size of strut section would not make any appreciable difference. The same applies to the tubular wheel axle, which we shall be able to make of approximately the same section by streamlining.

As for the resistance of the wheels this is approximately 2.4 lbs. per wheel at a speed of 70 m.p.h. We shall take this as sufficiently accurate for our purpose and use this figure direct without making allowance for size of wheel and our lower speed of 65 m.p.h. For the resistance of bracing wires we employ the formula $F = KDV^2$, and the value of the constant K for the diameter of wire and velocity under consideration may be taken as 0.0013. This gives a resistance per ft. run at 95 ft./sec. of about 0.14 lbs., from which figure we can obtain fairly accurately the "drift" or resistance of all the stay wires. For the resistance of tail planes and tail skid it is difficult to get accurate figures unless we have these tested in model form, but as a rough approximation I have taken 1 lb. more than that given in the N.P.L. report for estimates of tail of B.E.2, which is 2 lbs. at 60 m.p.h.

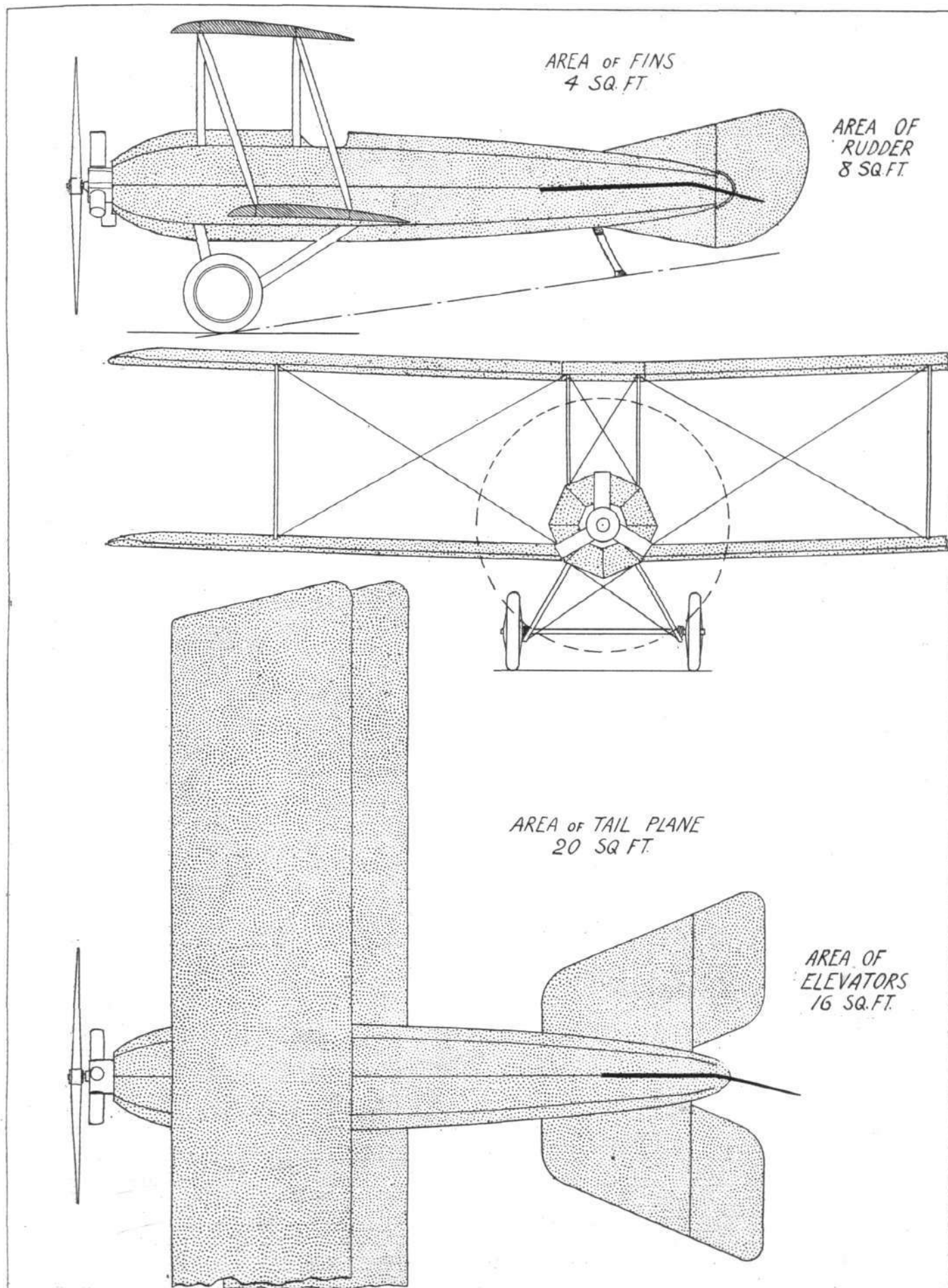
The resistance of the items outside the slip stream are obtained in the same manner, and the results shown in

Table of Resistance of Parts in Slip Stream at a Velocity of 95 ft./sec.

Item.	Resistance (lbs.).	Vertical Distance from Line of Thrust.	Moment (+).	Moment (-).
Body	9.00	0	—	—
Engine	26.00	0	—	—
12 ft. of centre struts	1.56	+2.50	3.90	—
10 ft. of chassis struts	1.30	-2.00	—	2.60
Axle	0.52	-3.00	—	1.56
1/3 wheels	1.50	-2.20	—	3.20
12 ft. of bracing wire	1.60	-2.00	—	3.20
10 ft. of lift wire ...	1.40	+0.25	0.35	—
Tail planes	3.00	0	—	—
Tail skid				
Total	45.88	—	4.25	10.56

Table of Resistance of Parts Outside Slip Stream at a Velocity of 95 ft./sec.

Item.	Resistance (lbs.).	Vertical Distance from Thrust Line.	Moment (+).	Moment (-).
20-ft. wing struts	2.60	+1.75	4.55	—
62-ft. bracing wire	8.70	+2.00	17.40	—
3-ft. centre plane struts	0.39	+3.60	1.40	—
2/3 wheels	3.30	-3.25	—	10.7
Total	14.99	—	23.35	10.7



Outline drawings showing general arrangement of the "Popular" biplane.

the second table. In both tables the moments about the thrust line have been calculated, items acting above the thrust line being given a positive value and those acting below the thrust line a negative value.

We now have to consider the effect of the slip stream on the items in the first table. It has already been said that these parts are exposed to a draught of slightly higher velocity than are those outside the slip stream, how much higher depending on the percentage of slip ratio. For the present purpose I suggest taking the velocity in the slip stream as $1\frac{1}{2}$ times greater than outside it. This gives a total resistance of items in slip stream of 57 lbs. and the negative moment = 7.89 ft./lbs.

From the second table we obtain a positive moment of the parts outside the slip stream of 12.65 ft./lbs. In order to get the total resistance we must find the drift of the wings and the height of the total resultant above the centre of thrust, by drawing on a sheet of paper to some suitable scale a section of our wings with the correct gap and stagger. From the table given in our last issue the position of the centre of pressure at 2° incidence is found to be 0.425 of the chord from the leading edge. Marking off this point on both our wing sections, and connecting these two points by a line, we obtain the line on which the resultant reaction of our two wings lies. As, however, the upper wing in flight carries more load than does the lower one, the resultant does not lie halfway along this line, but about four-sevenths of its length from the chord line of the lower wing, this representing about the proportion of load carried by the two wings. Having done this we find that the total reaction on the wings is about 2 ft. above thrust line. The resistance of the wings was taken as approximately 85 lbs. at 95 ft./sec. without making allowance for the variation of lift/drift with speed and length of chord. According to the tests made at the N.P.L., however, a certain amount of correction is necessary when applying results on model aero-

foils to those of full size machines. While the lift coefficients can be used direct without any corrections the drift coefficients found in model experiments are slightly too high. In other words, the resistance of the full-sized wing is somewhat smaller than that indicated by the model figures. It is suggested that from 20 per cent. to 15 per cent. can be subtracted from the drift values. Subtracting 15 per cent. from the resistance of our wings we get instead of 85 lbs. 72.25 lbs. The total resistance of our machine at 95 ft./sec. should therefore be $57 + 14.99 + 72.25 = 144.24$ lbs. As the thrust we may reasonably expect to get with a 30 h.p. Anzani is stated by the makers to be 150 lbs., it looks as if we have managed to obtain the maximum speed we set out to get.

From the resistances of wings, parts in slip stream and parts outside slip streams and their distances from the thrust line, we get a total resistance—thrust couple of 149.26 ft./lbs., which is rather high, and will have to be counteracted either by raising the centre of thrust or by introducing an equal and opposite weight—lift couple, unless our machine is going to be likely to “hunt” or pitch.

With regard to the dimensions of the various tail surfaces, the method I have employed for obtaining the area of these is to examine a number of well-known machines and calculate the surfaces to be of a size, in conjunction with their distance from the c.g. of the machine, of proportions conforming more or less with standard practice. The usual method is, I believe, to calculate the size of tail for still air and then simply multiply the result by two to be on the safe side in view of the fact that the tail surfaces are working in the disturbed air from the propeller and wings. Of the two methods I chose the simpler one, which will, I think, be found quite as near the mark.

(To be continued.)

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The Anti-Aircraft Defences of London.

A DEPUTATION of London members of Parliament waited upon Lord Kitchener at the War Office on Jan. 27th, on the subject of the protection of London from raids by aircraft. Mr. Lalfour, the First Lord of the Admiralty, was also present, and it is satisfactory to note that among the M.P.s. was the newly-elected member for Mile End, Mr. Warwick Brookes, who has stated that he is a strong supporter of the air services. The following is an official report of the proceedings:—

The deputation was introduced by Sir Frederick Banbury; other speakers being Mr. Dickinson, Mr. Bardett-Coutts, and Mr. Wiles.

The Ministers explained to the deputation that the difficulties in arranging a satisfactory scheme of Metropolitan anti-aircraft defence had in the past been due to a deficiency in anti-aircraft material—a deficiency that was felt not merely in London but in the fleets and in the armies at the front. Every effort was being made to remedy the shortage, and with good results. A great development of Metropolitan defence had been effected since the last air raid; and the development was still continuing. Progress (it should be noted) was not confined to the increase and organisation of anti-aircraft artillery, under the able superintendence of Sir Percy Scott. It was to be found also in the improved arrangements for defence by aeroplanes.

In the common task of organising defence, the War Office and the Admiralty had worked most harmoniously together. But it had for some time been felt that unity of control was desirable; and as this could only be fully carried out if the whole work of defence was undertaken by the Army, all Admiralty responsibilities were in progress of being transferred to the War Office. The transference, it was hoped, would be complete within the next three weeks.

The members of the deputation were:

Right Hon. Sir F. G. Banbury, Right Hon. N. H. Dickinson, Right Hon. Sir G. Reid, Right Hon. T. Lough, Lord Claud Hamilton, Sir H. Samuel, Sir W. Pearce, Sir P. Magnus, Mr. Bardett-Coutts, Mr. H. Percy Harris, Mr. T. Wiles, Mr. J. D. Gilbert, Mr. G. H. Radford, Mr. A. W. Yeo, Mr. J. Boyton, Mr. Warwick Brookes, Mr. W. S. Glyn Jones, Mr. E. A. Strauss, Mr.

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A. Strauss, Mr. G. A. Touche, Mr. H. G. Chancellor, Mr. J. S. Fletcher, and Mr. Hector Morison.

The Kent Coast Air Raids.

THE two following questions were put to the Under-Secretary for War in the House of Commons, on the 26th ult., by Mr. Bennett-Goldney:—

“Whether any British aircraft gave chase to the enemy aircraft on the occasion of the recent night raid on the Kentish coast; and if he can reassure the inhabitants of the coast towns that there are at the present moment, and that there were at the time of the recent raids, British aeroplanes of equal swiftness to those of the enemy and manned with machine-guns capable of being fired as the aircraft flies in pursuit, in the near vicinity of the Straits of Dover.

“Whether he can give any further details of the recent air raids on the Kentish coast; if he can say whether any warning of the two raids was received beforehand either by the Admiralty, the War Office, or any other Government department; if he can say what length of time was allowed to elapse after the enemy aircraft was first sighted before any of our own aircraft made an ascent on each occasion, *i.e.*, the raid by night and the raid by day; and if he has any official information showing that the enemy aircraft were seen cruising about in broad daylight for over two hours.”

Mr. Tennant: The answer to the first part of the first question is in the negative, and to the second part in the affirmative.

To the first two parts of the second question I can only say that it is not in the public interest to add anything to what has already been published; and to the third part of the second question that on the occasions on which British aeroplanes ascended to attack the enemy the lapse of time between the sighting of the enemy aircraft and the ascent of the British machines was that required to prepare the machines for flight. The report referred to in the last part of question two is destitute of truth.

Mr. Bennett-Goldney: Ought not these aeroplanes to be kept ready for flight?

Mr. Tennant: They are kept ready for flight, but you cannot put an aeroplane into the air by merely touching a button.

KNIGHTS-ERRANT OF THE AIR.



GRAPHIC picture of the work of the Royal Flying Corps is given in the following despatch written by Mr. Philip Gibbs from the British Headquarters, under date January 10th, and recently published in the *Daily Chronicle*:—

"Now that our guns are so busy each day—yesterday the reverberation of their thunder-strokes never ceased for hours—the flying men are very active. It is their scouting over the enemy's lines which provides the gunners with many of their targets, of bricks and mortar or flesh and blood, and while the batteries are at work the aviator whispers down to them by wireless whether they are hitting or missing, and by how much is the margin of their error.

"It is the unwritten code of the Air Service that individuals should not be named in the reports of their exploits. If they were known, and if their adventures were told, some of them would be famous now, for the number of their single combats or fights against great odds, or audacious adventures far over the enemy's lines.

"There is precious little romance about this war—one cannot give a touch of poetry to a red shambles or to filthy ditches, where men crouch below explosive menaces of death—but I find just the one excuse for it in seeing these airmen go out for their day's flight.

"Seen nakedly in its reality, their work is terrible enough. They are out to destroy human life, to drop death into the middle of masses of men, if they have the luck to find them, or to wreck a railway train loaded with human freight if they can stoop low to fling their bombs. But they are as romantic as, say, those English knights, like Sir Walter Murray and the Black Prince's gentlemen, who, in this same country of Flanders, many centuries ago, rode out on fair mornings seeking an encounter with any enemy who might also be riding on the way with a sharp lance and a fighting spirit.

"Old Froissart has chronicled those adventures, and in his pages we may still get the thrill of those meetings near St. Omer or St. Quentin or round by Hazebrouck, where those English and French knights came across each other and shouted a challenge, and rode on a hard chase if the other side retreated before greater numbers. Death was the forfeit of the game then as now, and a mess of blood spoilt the end of each adventure, but the heart of youth leaps up to the courage of those knights, to their cool and cunning warcraft, to the high spirit with which they rode against all risks.

"In this war there are tourneys in the air, not now and then, but every day, when the English and German aviators scout across each other's lines and challenge each other to single combat round the corner of a cloud, fight to the death in a clear blue field of the sky, or fly down the wind in a hot chase from an unexpected squadron. The nerve of these men is astounding; their audacity beyond all belief if one has not seen it, as I have seen it, scores of times.

"They mount their saddles in the morning, after a cigarette or two, as though they were just taking a taxicab to Piccadilly Circus instead of mounting on frail wings into a wind-driven sky where there is almost sure to be an enemy behind the ambush of a cloud, or more certainly—without any fail—little darts of white smoke reaching up to them, making puff-balls all about them, with a wide scatter of shot in which one single bullet is enough to end all their flights, if it is the lucky one. Again and again I have watched them over the German lines, beating up against the wind, or flying steadily in still air, apparently unconscious that they are targets of high-angled guns planted somewhere in the ruined houses or the shell-slashed woods in the desolate places of war.

"The first gun is fired, and one sees a small smudge like the aeroplane itself, and fairly close to it. It breaks into a white cloudlet, and the machine ignores it. Another shell bursts, nearer this time, so that one holds one's breath. Soon there is a half circle of little white clouds flung very prettily across the pathways of the sky, but the airman stays in its loop, still poised above the enemy, still staring down, utterly indifferent it seems to this girdle of flying steel which is lassooed about him.

"I watched this sight this morning, and though it was a German aviator and our guns, I admired the high and steady courage of that quiet flight through the bombarded sky.

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"Mentioned in Despatches."

In the names published in a supplement to the *London Gazette* issued on the 27th ult., to be added to those recommended for gallant and distinguished service in the

"In the air due's, by swift attack and skill in aircraft, our men are wonderfully good; better almost always than their enemy, if they have the same power of machine, and certainly more eager to give chase. On December 29th last, one of our air captains engaged several hostile machines with an obstinate courage which would seem to me extraordinary if I did not know that it is the ordinary daily work of many of his comrades.

"He saw an enemy aeroplane over our lines that morning and rose to chase it. It heard the hum of his engine and did not like the sound of it, slipping into the nearest cloud and so away. Our air captain scouted round in the hope of a fight and saw another enemy below him.

"He stooped like a hawk in a steep nose dive, keeping a free hand for his Lewis gun. But the second enemy was not fighting to-day, and flew off in a hurry. Our man had climbed up an invisible spiral to 11,000 ft., and from this cold, high loneliness saw a third enemy, and stole a march upon him until they were at close range. The German nose-dived, turning as he dropped towards his own lines, but followed by the swoop of the Morane scout and by a splutter of bullets from the Lewis gun. The enemy dived still more steeply, and his engine seemed to be breathing out black smoke, which left a curling trail behind him, too dense to come from his exhaust, and too black to be the burnt vapour of engine oil. He was obviously hit, and his planes staggered uneasily, until gradually balance was recovered, and he plunged into a cotton-wool mist and so escaped.

"The Morane scout mounted again, circling up and up to 12,000 ft., and then cruising round for prey. Two enemies were flying along a sky-line between one French town and another in German occupation. But they did not get back to luncheon without having to fight for their meal.

"The scout chased and overhauled them, and then, choosing the larger, which was an Albatros, attacked from above and forced it down under heavy fire.

"But as it happened by ill-luck for the English air-captain, three other German aviators were taking a promenade in high places, and seeing their distressful comrade, came to the rescue in a steady downward swoop.

"The scout was between three fires, and the machine-guns were lashing streaks of lead about him. It was his turn for flight and he retired from the unequal battle at full speed. It seemed enough for a morning stroll round the sky, but on the way to some white ruins which make a good signpost for the road home, he saw his ninth enemy (his encounters numbered nine if you like to reckon them) sailing along over a certain wood.

"Our air-captain did not like to pass him by without a challenge, and gave chase. The engine was working well and raced down the other machine, so that the Lewis gun was within range. Only 100 yards of air divided the two flying men. They could look into each other's eyes, which was good enough for a challenge to the death.

"But the German had the luck, for below him were some anti-aircraft guns, and out of the puff balls they threw up came a splinter of steel which hit the Englishman's hand on the trigger of the Lewis. The word spoken by the scout was lost in the great spaciousness.

"It need not be recorded by a mortal pen, for it was only a little one. But as he could no longer shoot, this knight-errant of the air abandoned the duel and went back to his flying ground to make his usual report.

"This is not an unusual story. I could fill all the page in which this one will be printed with similar adventures, all belonging to this year's record, though the year is still a youngster. If I could give the names of the men engaged they would be worth telling and remembering, but the anonymous description makes one example good enough to show the cool courage of those hatchet-faced young men who peer about the skies of war, and then come to earth again with a matter-of-fact manner for another cigarette and an overhauling of the engine, which is a living thing to them and very lovable when it is running well.

"Those fellows belong to the same blood and spirit as those knights who rode through the Clarendon Forest 500 years ago, looking for any gentleman to kill or to chase if he declared himself an enemy. The chief difference is in horse-power and the way in which they ride."

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field, in the despatch of Viscount French, dated November 30th, 1915, and published on January 1st, there was the following:—

Royal Flying Corps.—Captain (Temporary Major) A. E. BORTON, D.S.O., Royal Highlanders.



Dreams, Dreaming, and Dreamers.

DREAMS are looked upon generally as being all taradiddle and fiddlededee, and in the sense that they ever foretell events, perhaps this is true. That they can nevertheless prove interesting reading when published in book form, has been proved by Mr. E. M. Martin, of Stratford-on-Avon. Mr. Martin's dreams appear to be coherent, and particularly vivid, and having a clear recollection of them in the morning, he is able to write them down.

Everybody remembers the old dream book of our youth, which set out to explain the meaning of dreams by always taking the opposite, which was perhaps a safe way out of the difficulty, and found amusement for, and engendered hopes in the breast of the little handmaiden who, dreaming of a "tall, fair man," would look out for a short, dark one.

In reviewing Mr. Martin's book, the *Times* has taken the matter somewhat seriously, and suggests that war-time dreams should be recorded and investigation made by a trained mind.

As a dreamer, I naturally take some interest in the matter, as I also do in prognostication, intuition, second sight, thought transference, and the rest of it, all, to my mind, containing some element of possibility too evident to be lightly thrown aside.

Let the person be who he may, and never so strong minded, right down at the bottom of his thoughts he has some misgiving as to whether after all there might be something in some if not all of these things.

Naturally, in a world of scoffers, the person who really does have strange things happen in his own immediate surroundings, keeps it to himself in the fear that he will be laughed at, and perhaps earn the unwanted reputation of an eccentric. And thus, things that would bear the light of investigation for the benefit of learning are lost to the world.

Mr. Martin has had the business acumen to turn his dreams to account by publishing them in book form. Had I the same business instinct I should have done this years ago, for be it said, that I am a dreamer other than as the writer of this page. Although I can see now that I have delayed until I have lost the market, so to speak, and might have made interesting reading matter had I written down all my night-pictures and other things, I am emboldened, when the *Times* treats the matter in such serious vein, to make a clean breast of things in the hope of inducing others to do the same.

In taking the plunge then, let me say that I can dream or not as I wish, and not only so, but in determining to dream, as I often do, thoroughly enjoying the experience, I have some power in ordering my dreams.

Everybody knows the ability one has to rise at a certain time in the morning by simply going to rest with the firm determination to do so. For myself, I can awake at any hour, no matter how early or how unusual, without fear of a slip. It is the same with dreaming. I have but to say to myself as I lie down, "I will dream

to-night, and I will dream of Zeppelins," and it takes place with certainty. I cannot say my dreams are always coherent, but they are always vivid, and I can always remember every particular in the morning.

Only once have I dreamed anything that foretold an event. On the night previous to Hamel being lost, I dreamed the whole catastrophe, with but one exception, and that was, that he appeared to have Miss Davies with him, which was perhaps but an association of ideas. I did not know at that time that he had even gone to the continent and was likely to fly over, yet one can imagine my feelings next day when waiting his arrival.

But I will pass on to other things more potent, and less able to be explained, hoping not to be thought eccentric or unusual.

As a foreword, let me say that I can no more foretell events than you can, my reader, and I have no explanation to offer, but seek yours.

It is understood that all men are not alike, either in temperament or other things, and it is unkind and unjust to doubt the veracity of one who tells of something happening to himself, simply because it is not understandable, and what I state here goes forth with my pledged word.

In order to be understandable, I must build the story of my experiences up gradually. In youth, I often astonished my parents by knowing of things and happenings of which I was supposed to be kept in ignorance. I had a sister, a year older than myself, of the same temperament, and it was truly marvellous what we used to do between us.

Later, this sister and myself used at parties to perform that little entertainment of finding hidden things, but in our case there was no trickery. It was only necessary for one or the other to be in the room and see the article hidden, and the other would come in and arrive almost at once at the solution, no matter how difficult, or how unusual the article or the place of hiding. I don't know that there was any thought transference. For myself, no sooner did I enter the room than I knew as clearly as though I had seen the preparations what I had to do, and never once have I failed. I cannot explain it, but I was helpless without my sister and she without me.

In later years I always knew when she or my mother would visit my house. Once I was living in Yorkshire, and had not seen my mother for three years. On leaving for business one morning, I said to my wife: "Somehow I've got an idea mother will come to-day." Being then 200 miles or more away, and no letter having been received even hinting at a visit, it was thought very improbable. Mother was not there when I returned in the evening, but she arrived whilst we were at dinner. Strange to say, she told us that she had only thought of it, and decided to pay a surprise visit that morning whilst having breakfast, and we found on comparison that the time exactly coincided with that of my impression. Again I can offer no explanation.

I fear I am running over my allotted space, but will continue, hoping you are not bored.

I am not superstitious, yet I cannot but take notice of happenings. Therefore I have never been up in an aeroplane, and never shall. Those of my friends who have wondered at my refusals of joy rides, will know now. If I went up in an aeroplane that would be the end of me, the pilot and the machine. Laugh if you like, but I know. It is not from any fear of flying. I do far more risky things, and think nothing of them.

I will give you this as a set-off against that which I am about to tell. I have been at aerodromes and felt bad, and sure that something would happen and nothing has happened. But can anybody explain these items?

The late E. V. B. Fisher, in 1912, used to contribute "Brookland Notes" to "FLIGHT," and I knew him pretty intimately. I should have been his passenger on the "Flanders" when he and Mr. Mason were killed, but at his suggestion I gave way to Mr. Mason.

I was the only person who actually saw Desoutter's accident at Hendon. I felt sure something would happen to him on that flight, and went out and climbed No. 1 pylon to watch him.

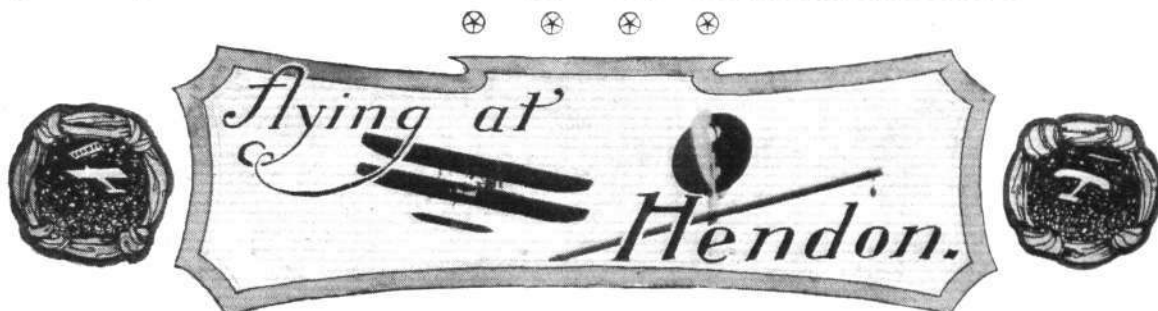
When Pickles had his bad smash on the Champel, I had left the aerodrome about fifteen minutes, because I found it absolutely impossible to stay any longer, as I felt so bad inside.

One bright Sunday I went to Hendon with a friend

about two o'clock. Just before three I felt so bad I had to go into the pavilion and have some brandy. By four-thirty I felt that I had no inside, and begged my friend to let us go, as I was sure something would happen, but was persuaded that it was all right, and stayed on. Poor Marty was killed shortly afterwards, almost at my feet. I offer no explanation.

I sometimes write short stories for the magazines. About two years ago there was a murder case in America, in which a doctor, a mayor and their two wives were connected. The murder took place in the doctor's reception room, following an unpleasant incident which had happened a few days previously at a reception given by the mayor. Before the first item of the news reached this country, I had the story in rough manuscript form lying in my drawer at home. Story for story, item for item, incident for incident it was the same. I dared not send it out, for no editor in the world would have believed but that I had read the story and written it up as a tale. I brought the MS. to the office on the morning that the news was printed here, in order that my colleagues might bear me witness.

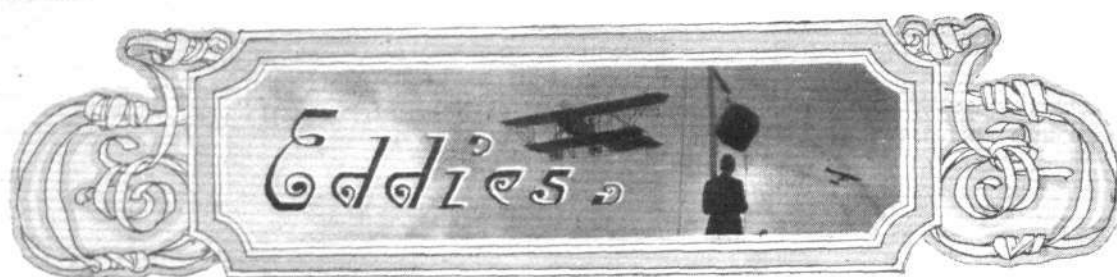
Now. Please do not write me down a strange fellow. I am not eccentric. Those who know me best consider me about "par" with a tendency to harden. I have simply made a clean breast of all this because I think I ought to, and because I am not such a fool as to think it is all bosh if I don't understand it.



As the mud at Hendon decreases the flying and attendance increase. Last week-end both the latter were very good, whilst the weather was, for once again, ideal for flying. On Saturday afternoon school work started quite early, but, for some reason or the other, passenger flights were not as numerous as one would have expected. Of exhibition flights, both "official" and "unofficial," however, there were plenty. One of the latter provided a little excitement, for what might have been a rather serious accident was only just averted by sheer good luck and skill on the part of the pilot. Two De Havilland pusher scouts were leaving for "somewhere," and owing to the direction of the wind a start had to be made directly opposite the enclosure. The first one—piloted, I think, by W. Birchenough—got away all right, but with none too much room to spare when over the sheds, and soon was well on his way. The second one, however, did not seem to get off so quickly, and when he did, the engine started to miss a little. Just before he got to the enclosure, when certainly not 100 ft. up, the engine gave up the ghost. Then followed a couple of minutes' anxiety as he glided silently towards the roofs of the sheds, which he appeared to miss by only a matter of a few feet. Behind the sheds are two trees, which he managed to dodge, and then making a short left hand turn he landed, or rather pancaked, in the *small* field adjoining the aerodrome none the worse for the adventure. A little later he managed to fly out of the field and resume

his journey. Another interesting item in the afternoon's programme was a looping display by W. Roche-Kelly on the 50-55 h.p. Beatty-Caudron. It was not the first time that this pilot has looped, for I understand he did so on two other occasions about two weeks back. He makes a very clean loop without having to dive to any great extent. On this last occasion he made a very fine loop, but unfortunately I do not think many of the spectators noticed it, as no announcement was made as to his intention of doing one. If this were done in the future, perhaps more people would be attracted to Hendon, as it must be admitted that, although interested considerably in flying, the "B.P." is now getting very *blasé* and require something rather out of the ordinary. J. H. Moore was out on his 50-55 h.p. L. and P. biplane, executing numerous stunts in fine style—but *just* a little higher up next time, please. Several other pilots were out, including R. Kenworthy on a 50 h.p. Beatty-Wright, Manton, Osipenko, &c., on the 60 h.p. G.-W. "buses. A 130 h.p. Salmson-Voisin also aired itself, but confined its operations to *terra firma*.

Sunday was another good day, and most of the pilots and machines were out. Amongst the pilots out doing exhibition work were Geo. W. Beatty on the 50-55 h.p. Beatty-Caudron, R. Kenworthy on the 50 h.p. Beatty-Wright, J. H. Moore on his 50-55 h.p. L. & P., G. Virgilio on the 60 h.p. Ruffy-Baumann Caudron, whilst Marcus D. Manton, J. S. B. Winter, and Hale on G.-W. "buses, and other pilots, were busy with pupils.

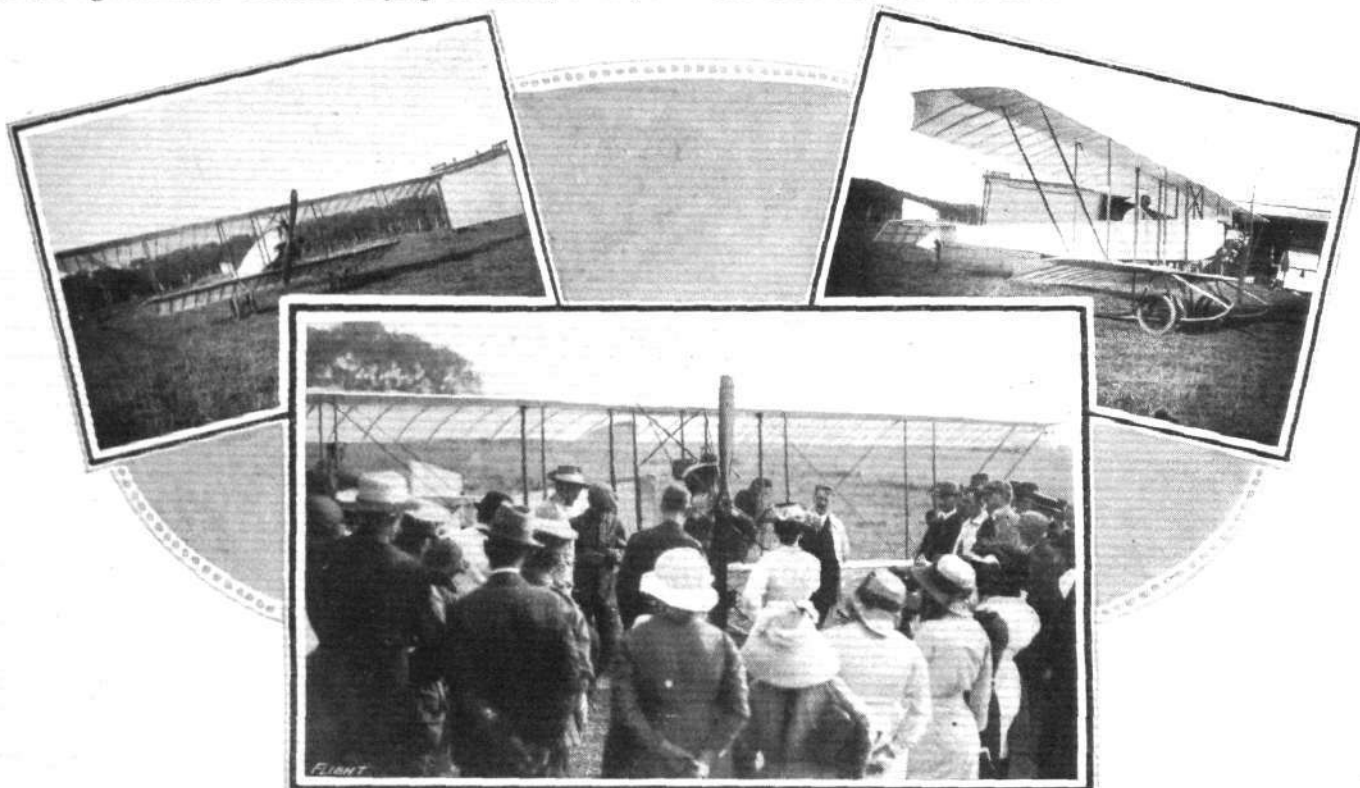


REFERENCE has been made in "Eddies" from time to time to the good work that has been and is being done by the various pioneers of aviation out in our Colonies, notably in different parts of Australia. Badgery, Jones and Scotland are names that come to mind instantly in this connection. It appears that more have been added lately, according to a letter we have received from Brisbane, Queensland:—"On November 22nd, 1915," my correspondent writes, "at Hemmant, near Brisbane, the official christening took place of what is claimed to be the first aeroplane built in Queensland. The machine, which has Caudron-type wings, is fitted with a fuselage.

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It has been built by voluntary effort by the members of the Queensland Volunteer Flying Civilians, a corps

"The constructional work was done in Brisbane, at St. Paul's Presbyterian Church Hall, which was lent for the purpose. The dimensions are: Span of top plane, 33 ft. 9 ins.; span of bottom plane, 21 ft. 9 ins.; chord, 4 ft. 6 ins.; length o.a., 23 ft.; tail plane, 7 ft. 5 ins. on leading edge and 9 ft. on trailing edge, with chord of 1 ft. 7 ins., beyond which are two flaps 16½ ins. wide. The main spars, struts and skids, are of best American hickory. The ribs and formers are of Queensland maple. The fabric is Irish linen doped with celluloid dissolved in acetone. The propeller was made by James Moore and Sons, Proprietary, Ltd., in Melbourne, and the tyres by the Queensland Vulcanizing Co., Brisbane. The power plant is a 35 h.p. Anzani, inverted Y type. Men are being trained already in 'rolling' with good results. The men who did the constructional work under the



AN AUSTRALIAN-BUILT BIPLANE.—The top view shows a biplane built by the Queensland Volunteer Flying Civilians, while below is seen the crowd at the christening ceremony of the machine at Hemmant, near Brisbane.

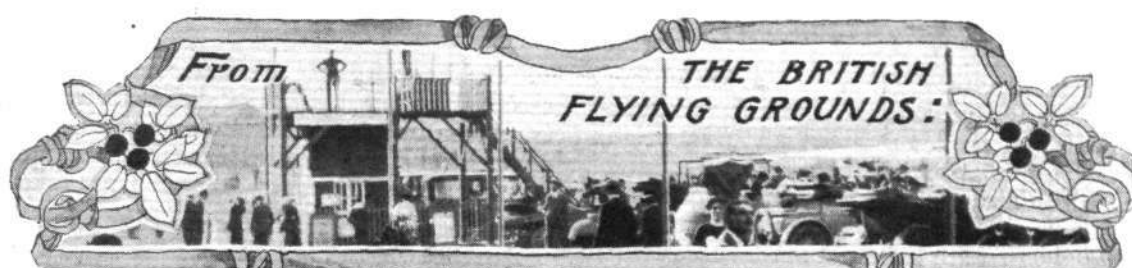
formed and controlled by Mr. Thomas Macleod, a Brisbane barrister, author of several legal publications. The corps, though not run by the Defence Department, was formed with the sanction of the Minister for Defence, and its object is to train civilians as aviators for defence purposes and for active service. No members were accepted unless they signed to go on active service if required. No member is to pay for tuition, nor does any member receive any pay. The funds required for building the machine and its hangar were raised by Mr. Macleod by appeals through the leading Brisbane daily paper, the *Courier*, after which the machine has been named.

supervision of Mr. Macleod, are Herbert George Smith, William Fraser, A. J. Thynne, junior, Ernest Handley, V. G. Sardon, George M. Cherry, Valdemar Rendle, H. H. Turk, R. H. Knyvett, R. de Mattos, Chas. L. Clark, Harold Dent, C. V. J. Heyelmann, Frank Clarke."

x x x

"Mr. Macleod and a number of the men have volunteered to come to England for training and active service." Well done, Queensland! That's the spirit. Here's wishing the V.F.Cs. a big measure of success, and may the "Courier" soon be followed by more powerful machines.

ÆOLUS.



London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School (R.N.A.S.).—Straights last week with instructor: Probationary Flight Sub-Lieuts. Colquhoun, Evans, How, Kingsford, Maxted, Rees and Templeton. Circuits and eights: Probationary Flight Sub-Lieuts. Aitken, Cook, Cuckney, Durston, Jones, Rampling and West. *Brevets* during week: Probationary Flight Sub-Lieuts. Burden and Rockey.

Grahame-White Civilian School.—Straights with instructor: Messrs. Baragar, Sandys, Barret, Eichelbrenner, Hillaby, Holman, Box, Hathaway, Leigh, Matthews, Kryn, Parkinson, Walk, Verguilt, Williams, F.; Williams, S.; Butler, Franck, Stapley and Scheidt. Circuits with instructor: Mons. Grasset. Eights alone: Messrs. McClaughrie, Howe and Hallet.

Instructors during week: Messrs. Biard, Hale, Pashley, Manton, Russell and Winter.



Some of the pupils at the Grahame-White Naval School at Hendon.—From left to right (commencing with bottom row): Probationary Flight Sub-Lieuts. D. A. Aitken, S. V. J. Maxted, T. H. Newton. Second row: Probationary Flight Sub-Lieuts. C. E. Burden, M. R. Kingsford, D. M. West, H. A. Colquhoun. Third row: Probationary Flight Sub-Lieuts. J. L. A. Rees and H. Rampling; and at top, Mr. A. Murray Ross (Manager).

Beatty School.—The following pupils were out during the week: Messrs. Byrne, Richard, Thompson, Aoyong, Baker, d'Allesina, Dunne, Jaquin, Wainwright, Young, Brynildsen, Cumming, Fellowes, Jones, Stampe, Symington, Whincup, Williams, Willmet, Collier, Schollaert, Barrow, Bowick, Brand, Branford, Drysdale, Edwards, Patterson, Podmore, Sellars, le Champion, Martin, Mattos, Mossop, Halford-Thompson, Parsons, Hungwan, Roberts, and Knox.

The instructors were: Messrs. G. W. Beatty, W. Roche-Kelly, G. Virgilio, R. Kenworthy, A. E. Mitchell, and L. L. King, the machines in use being Beatty-Wright dual-control and single-seater propeller biplanes and Caudron tractor biplanes.

Mr. Hodgson flew for his certificate on the 24th, making excellent flights and landings.

Thirteen passenger flights were taken during the week.

Captain Cowper, who took his certificate at this school on Nov. 6th, has just taken his wings after only 16 hrs. 23 mins.' practice subsequent to taking his certificate.

Hall School.—Last week was another busy one for Hall School pupils. With C. M. Hill and H. F. Stevens: Messrs. Redford, Evans, Ridley, Nicolle, Smith, Sepulchre, Ormerod, and Cook. Certificate taken by Manley in excellent style. With J. Drew: Messrs. Thom, Neal, Lieut. Cooke, Millburn, Wooley, and Chapman. With A. Chave: Messrs. Rayne, F. Smith, Rochford, Mahoney, Warsick, Rand, and Hucklesby.

Machines in use: Hall Government type tractors.

London and Provincial Aviation Co.—Pupils doing rolling last week: Messrs. Creaghan, Palethorpe, Aldous, Starey, Scott, Moore, Brown, Egelstaff, Clement, de Goussencourt, Vilain XIII, Pulford, Rimer, Dawson, and Houba. Doing straights: Messrs. Darwin, Vertongen, Lambert, and Verbessem. Circuits and eights: Messrs. Stevens, Loomes and Snow.

Instructors: Messrs. W. T. Warren, M. G. Smiles, C. M. Jacques, H. Sykes and W. T. Warren, jun.

Royal Aero Club Certificates were taken by Messrs. E. F. Loomes and W. Snow.

Bournemouth School.

Pupils doing rolling last week: Messrs. Smith, Simpson, O. Wilson, J. Wilson, Morley, Meens, and Devos. Doing straights: Messrs. Dubois and Bonnevo.

Instructors: F. King and J. G. Woodley.

Machines in use: Caudrons.



Another Police Warning to Keep Under Cover.

THE following official notice was issued by the Metropolitan police authorities on January 26th:—

"The increase in the offensive protection against hostile aircraft recently provided in the Metropolitan District makes it the more necessary for the public on the occasion of air raids to take cover, so as to be sheltered from falling fragments of shells.

"On a previous occasion a warning regarding this was published which the Commissioner of Police now deems it advisable emphatically to repeat."

Blériots Still Used for Training.

IN Parliamentary papers circulated last week, Mr. Tennant stated that a few Blériot aeroplanes are still being purchased. They are used by the Army only as training machines.

THE 160 H.P. MERCEDES AERO ENGINE.

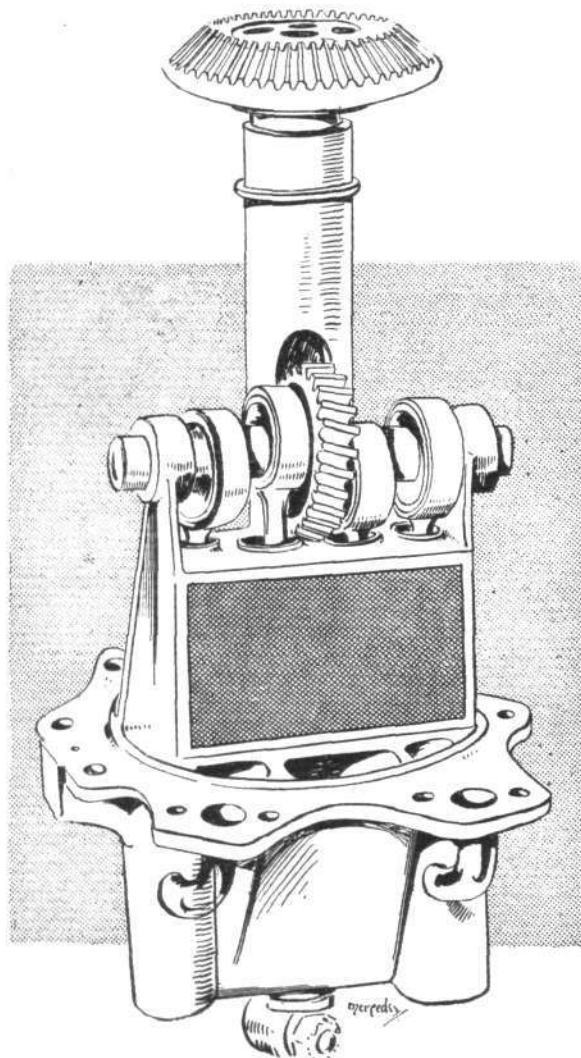
(Continued from page 83.)

IN the connecting rods there is nothing unusual. These are of H section steel, machined all over, weigh 5 lbs. 14 ozs. each, and have a length of 291 mm. Big end bearings are of bronze backed white-metal of ordinary design, having a length of 73.76 mm., the cap being retained by two bolts that are hollowed out for about half this length, presumably for saving weight, while for a similar reason the cap itself, but not the bearing, is much perforated. A bearing length of 71 mm. is provided in the small end of the connecting rod, which is not bushed except for the floating "liner" previously mentioned.

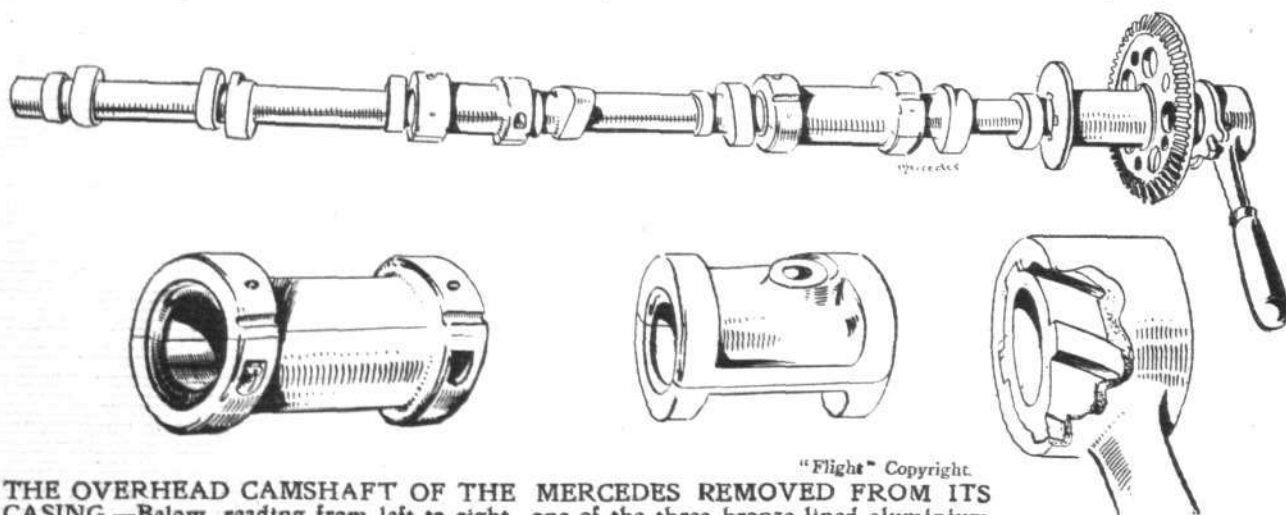
Extraordinarily massive is the crankshaft, which, in spite of being hollow, weighs no less than 80½ lbs. Its overall length is 5 ft., with a diameter of 55 mm. for the main bearings and 57 mm. for the crankpins, all such measurements, it must once more be emphasised, being only approximate, having been taken by callipers and not by micrometer gauge. Dimensions of the seven main bearings are: Fore-end (tractor screw) 90 mm. long, rear end 75 mm., five intermediate bearings 50 mm., crankpins 75 mm. long. Crank cheeks 24 mm. thick and 78 mm. wide. At the front of the foremost main bearing is a double ball thrust washer to take the pull of the tractor screw, and this is neatly enclosed in a bronze cover formed of two cups housed in an extension of the two halves of the basechamber. A similar extension at the rear encloses the bevel crown wheel and pinions forming the distribution gear, both such extensions being virtually oil baths for the lubrication of the enclosed parts. The bevel crown wheel in question is fitted to the crankshaft merely by splines or castellations, its position on the shaft longitudinally being determined by an aluminium cap bolted on to the main castings and housing a ball thrust that abuts against the crown wheel. Movement along the shaft inwards is of course prevented by the end thrust imposed by the action of the bevels, any adjustment of the mesh of the teeth therefore having to be made by packing up the ball race in its housing.

Two vertical shafts are driven from this bevel crown wheel, one above and one below. The former drives the magnetos, of which there are two, the centrifugal water pump, and the overhead camshaft. The magneto platforms are arranged just above the crankshaft bevel, one on either side of the vertical shaft, and are cast integral with the top half of the crankcase. Steel straps

secure the magnetos to the platforms, and the armatures are driven by a second bevel enclosed in a box that also serves to house the bearings from the vertical shaft. Further, above, the latter is splined and by means of the splines drives the water pump that is mounted direct



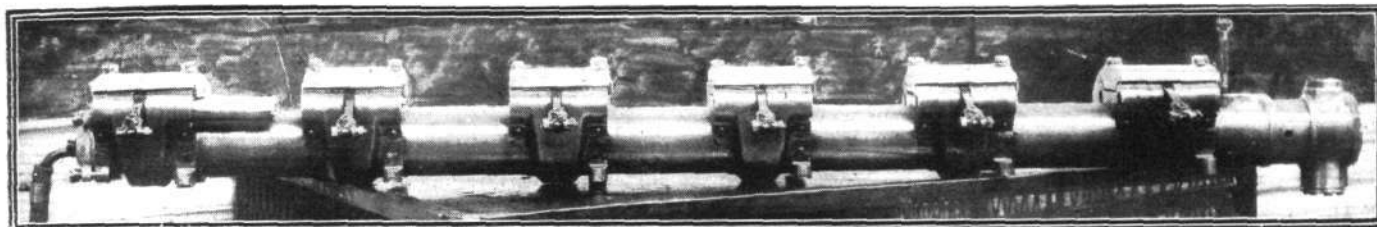
"Flight" Copyright.
Sketch of the Mercedes oil pump unit.



"Flight" Copyright.
THE OVERHEAD CAMSHAFT OF THE MERCEDES REMOVED FROM ITS CASING.—Below, reading from left to right, one of the three bronze lined aluminium sleeve bearings, the solid bronze bearing for the hollow spindle of the bevel wheel, and the quick screw thread for moving the camshaft axially. Two of the main bearings are shown in place on the camshaft.

thereon. The pump casing forms a part of the tube enclosing the vertical shaft from the bevel box upwards. A third bevel at the top of the vertical shaft engages with a bevel on the camshaft, the latter also being enclosed in an oil-tight casing throughout its length. The casing itself is of bronze and carries six boxes that enclose the cams and rocker arms, each box

not directly mounted on the camshaft, but on a separate hollow shaft through which it passes, the driving connection between the two being by splines. This is to enable the camshaft to be given a longitudinal movement at will for an object to be detailed later, without at the same time disturbing the position of the bevel relative to the vertical driving shaft. A bronze sleeve bearing



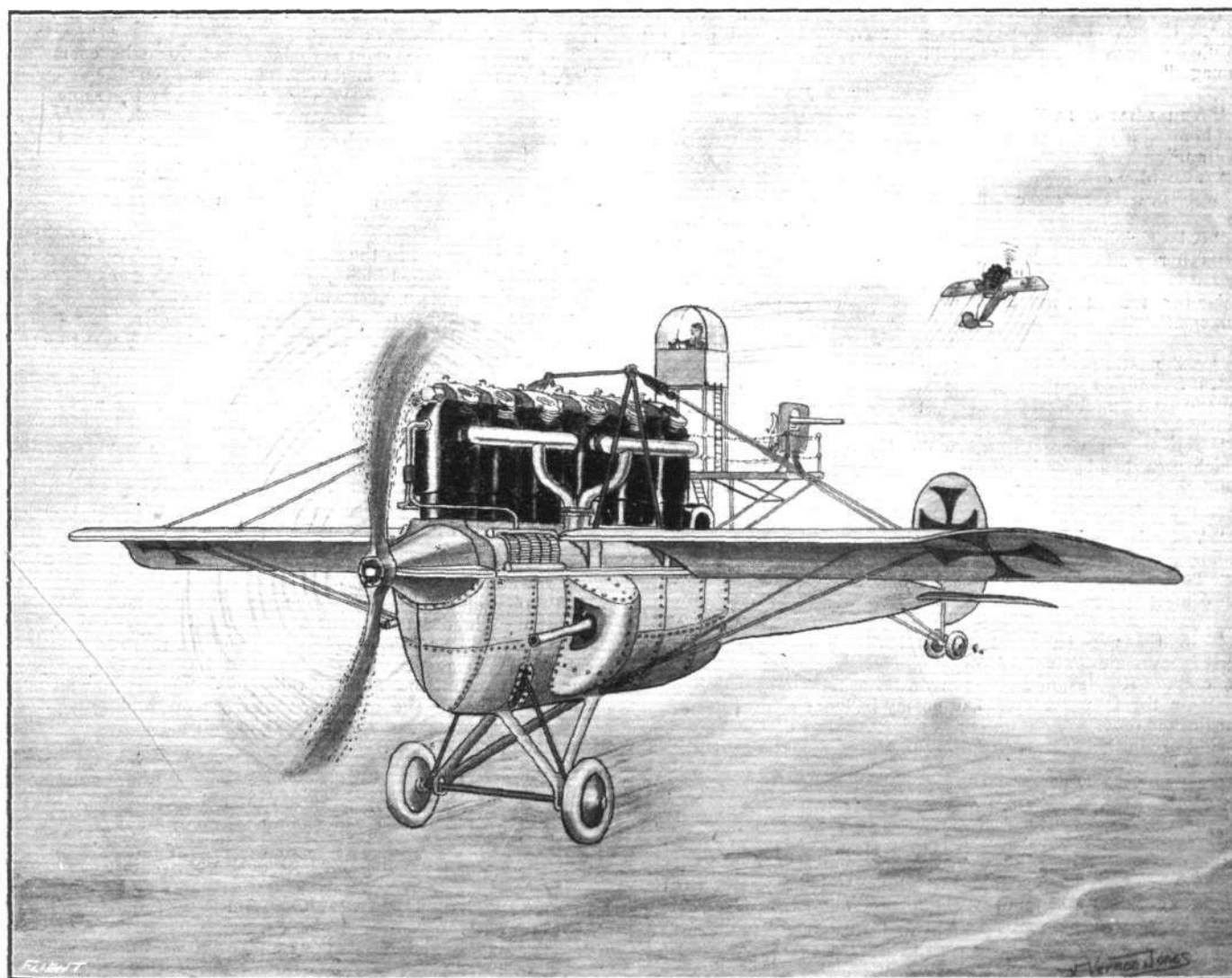
"Flight" Copyright.

Photograph of the bronze tube enclosing the overhead camshaft of the Mercedes engine. One of the hollow spindles on which the rocker arms oscillate is shown partly driven out of its housing.

being bolted to its corresponding cylinder head, by which arrangement further stiffness to the cylinders, considered as a unit, is obtained. In the bronze enclosing tube the camshaft is carried in three long bearings, each consisting of an aluminium sleeve, split longitudinally, and lined with phosphor bronze. The driving bevel is

supports the hollow bevel shaft, this being retained in place in the tube by a flat-bottomed plug screwing into a suitably-shaped recess in the bearing; the latter is split longitudinally, the two halves being connected together by two dowel pins.

(To be concluded.)



"THE DEADLY FOKKER."—From a drawing by our tame inventor, after assimilating from the various ha'penny newspapers particulars of the wonderful versatility and achievements of this German "strafer."

AIRCRAFT WORK AT THE FRONT.

OFFICIAL INFORMATION.

British.

General Headquarters, Jan. 25th.
"Aircraft on both sides have been active. We have maintained our supremacy."

General Headquarters, Jan. 26th.
"Yesterday twenty-seven hostile aeroplanes were encountered, and three captive balloons were attacked. Two aeroplanes and two balloons were forced down."

"All our machines returned safely."

Admiralty, Jan. 26th.
"A report received from Dunkirk states that two aeroplanes dropped bombs on Dunkirk about six a.m. this morning."

"A German seaplane was forced to the water by a British machine north east of Nieuport, about eight a.m. this morning."

Cairo, Jan. 25th.
"The British troops marched from Mersa Matru on January 22nd to engage the enemy, who had been located by aeroplane reconnaissance. The weather conditions were most unfavourable, rainstorms rendering the ground heavy and difficult for the transport."

Paris, Jan. 25th. Afternoon.
"This morning two German aeroplanes dropped fifteen bombs on Dunkirk and suburbs. Five persons were killed and three wounded."

Paris, Jan. 26th. Evening.
"Last night a Zeppelin dropped some bombs on the villages in the district of Epernay, but the material damage was insignificant. The dirigible was cannonaded by a section of our motor-guns at the moment when it was returning to its lines."

Paris, Jan. 28th.
"As a reprisal for the bombardment by a Zeppelin of the villages in the region of Epernay on January 25th, one of our dirigibles bombarded Freiburg-in-Breisgau during the night of January 27th-28th. Eighteen bombs of 155mm. and 20 of 90mm. were dropped on the station and the military establishments, which suffered serious damage."

Paris, Jan. 30th.
"A squadron of 14 French aeroplanes yesterday dropped numerous bombs on the enemy cantonments of Bazarli, north of Lake Doiran."

"Yesterday evening a Zeppelin dropped bombs in Paris. About 40 women, old men and children were hit."

Paris, Jan. 31st.
"It is officially announced that a German airship appeared over Paris shortly after ten o'clock yesterday evening. It was fired upon by batteries and was attacked by aeroplanes. The airship dropped a number of bombs, which, so far as is known at present, did no damage."

Later.
"A Zeppelin made a fresh attempt yesterday to fly over Paris, but, if Saturday night's raid, which caused twenty-five deaths and thirty-two wounded, was odious, that of yesterday was simply ridiculous."

"Ten bombs were thrown without result, and the Zeppelin, which was bombarded, was compelled to return hastily to the German lines."

Russian.
"Yesterday an enemy aeroplane dropped two bombs on Dvinsk, killing a woman."

"The enemy is again using balloons to scatter proclamations in our camps."

Petrograd, Jan. 26th.
"On the two banks of the Dvina and at Dvinsk German aeroplanes were active. A Zeppelin flew from Jacobstadt in the direction of Riejtza, and returned via Dvinsk."

"On the Upper Strypa four enemy balloons were sent up over our lines in order to light up our positions. Two of these balloons caught fire in the air, and in falling produced a dazzling light."

Petrograd, Jan. 27th.
"On the western front German aeroplanes continued to make frequent flights over the Riga and Dvinsk regions, where they dropped bombs."

Petrograd, Jan. 28th.
"In the region of Riga there was cannonading. During the bombardment of Shlock, German aeroplanes, while regulating the artillery fire, threw bombs at several points."

"Several Zeppelins dropped bombs in the region of Dvinsk."

Petrograd, Jan. 30th.
"On the Middle Strypa front we bombarded two enemy batteries. From two observation balloons it was seen that enemy guns and caissons were hit."

German.
Berlin, Jan. 25th.
"A German aerial squadron attacked the military works and flying station at Nancy and the factories at Baccarat. Near Saint Benoist, north-west of Thiaucourt, a French biplane, with its occupants, fell into our hands."

Berlin, Jan. 26th.
"Naval aeroplanes attacked the military establishments of the enemy near La Panne. Our army aeroplanes attacked the railway establishments of Loos, to the south-west of Dixmude and of Bethune."

Berlin, Jan. 28th.
"Statements have been made in the British House of Commons regarding the results of aerial attacks, the best answer to which is furnished by the following compilation of our and the enemy losses in aeroplanes."

"Since our publication on October 6th, 1915, viz., in the period since October 1st, 1915, the following German aeroplanes have been lost on the Western front:

"In aerial battles seven; aeroplanes shot down by enemy anti-aircraft guns, eight; missing, one; making sixteen altogether."

"Our opponents on the Western front lost in the same period forty-one aeroplanes in aerial battles, eleven were shot down by our anti-aircraft guns, and eleven were lost owing to forced landings within our lines, making altogether sixty-three."

"In these figures are included only enemy machines which it has been ascertained with certainty have fallen into our hands."

Berlin, Jan. 29th.
"Near Apremont, to the east of the Meuse, a French aeroplane was brought down by the fire of our anti-aircraft guns. The pilot was killed and the observer, an officer, injured."

"The aerial attack on Freiburg in the night of January 28th has caused but little damage. One soldier and two civilians were wounded."

Berlin, Jan. 30th.
"There is no further news regarding the enemy air attack on the open town of Freiburg."

Berlin, Jan. 31st.
"As a reprisal for the dropping of bombs by French aeroplanes on the open town of Freiburg, which is outside the field of operations, our airships during the past two nights have attacked the fortified town of Paris with satisfactory results."

Turkish.
Constantinople, Jan. 29th.
"Dardanelles Front.—On Thursday our aeroplanes dropped bombs on a monitor, which unsuccessfully fired in the direction of Akbach. Three of the bombs hit the vessel's after-bridge, setting it on fire, so that it was only with difficulty that she was able to get from Kephalos Bay to the Island of Imbros. Our aeroplanes pursued the hostile warship and three hostile destroyers which came to the rescue of the monitor, and once hit a destroyer. One of our aeroplanes also dropped several bombs on a big enemy transport in Kephalos Bay."

AIRCRAFT AND THE WAR.

IN a description of the evacuation of Cape Helles, written by Reuter's correspondent with the British Headquarters in the Mediterranean on 9th January, there is the following:—

"The 6th was again a bright and windless day. In the morning three German aeroplanes came over the position and hovered resolutely a long time over our empty bivouacs, although our gunners fairly filled the sky with shrapnel all round them, and machine guns spouted bullets at them whenever they came within range. They would not go till they had seen what they considered enough,

but whatever information they gleaned was useless, as the sequel showed."

A Central News message from Amsterdam on January 27th states:—

"Profiting by the clear nights and calm weather Allied airmen are constantly flying over the German positions in Flanders."

The *Echo Belge*, on the same date, reported:—

"The Allies are continually bombarding the dunes, and the naval actions are being followed by air raids. In spite of the

German anti-aircraft guns, the Allies have succeeded in flying over Bruges and Ghent, and after each attack columns of motor cars have been seen transporting numerous wounded Germans to the hospital at Bruges and Ghent. Last Monday an English squadron bombarded the Belgian coast for three hours, assisted by airmen. Last Tuesday Westende was shelled by British monitors. Allied airmen are continually flying along the Belgian coast up to Knock and Heyst."

A message from the Central News correspondent in Amsterdam, writing on January 26th, and giving information received from Northern France, says:—

"Meanwhile the Allied airmen are busily reconnoitring the enemy's troop movements.

"Three British and two French airmen successfully dropped bombs on the enemy's munition stores at Gravelle, four kilometres east of Bailleul, several stores being blown up."

The *Times* correspondent at Salonika, writing on January 29th, says:—

"The second of what promises to be a series of most effective air raids was carried out yesterday morning when French aeroplanes shelled and bombed a Bulgarian camp of 600 tents at Pazarli, north of Doiran, and 50 miles from Salonika. They threw and fired projectiles on the camp, setting many of the tents on fire, and were able to take photographs showing columns of smoke rising from the camp. The whole squadron returned to Salonika without loss.

"Marvellous accuracy of fire is claimed for the naval guns carried by some of the French aeroplanes which recently bombed Monastir. These guns, the exact calibre of which is kept a secret, can be aimed both obliquely and vertically.

"The results of the aerial bombardment of Monastir, which have now become known, seem to bear out this claim. The shells struck the 'old red barracks' and the new barracks built by the Germano Bulgars, the artillery camp, the Konak, which is now the headquarters of the Germano-Bulgar staff, the military club, the radio-telegraph station, the town hall, which has been fortified by the Bulgarians, and also the fortified heights round Monastir. The number of casualties is not known, but it is believed to be considerable. The whole duration of the bombardment was less than a quarter of an hour."

According to the Central News correspondent at Athens, it was reported that seventy persons were killed in the raid on Monastir.

The *Daily Chronicle* correspondent at Petrograd, writing on January 28th, says:—

"There is little change on the Russian western front, but it is worth noticing that in the Riga and Dvinsk sectors, the Germans have taken advantage of the warmer weather to engage very actively in air-scouting. A number of their aeroplanes have appeared over the fortified areas of Dvinsk and Riga, and, besides noting the positions of the Russian troops, have dropped bombs.

"A Zeppelin travelled as far as Rezhitsa, 65 miles to the rear of the fighting line. This unusually active reconnaissance may possibly herald an attempt to advance, but the military authorities here consider that such an attempt is unlikely, and consider that the object of the Germans is rather to guard against a possible Russian attack."

The *Daily Mail* correspondent at Salonika, writing on January 28th regarding the taking over of Cape Karaburnu by the French, says:—

"Simultaneously with the Karaburnu operations sixteen French aeroplanes left Salonika and flew over Pazarli, a Bulgarian village north of Lake Doiran, and dropped bombs on a Bulgarian camp consisting of 500 tents. The camp was set on fire. I have been shown a photograph of the fire by some of the airmen."

The following telegram was received in Amsterdam from Freiburg, in Breisgau, on January 28th:—

"Yesterday evening, after ten o'clock, two enemy airmen dropped five bombs on the town, causing material damage only. Nobody was injured.

"Being the Kaiser's birthday the theatre was full of people, who, however, quietly remained inside the building until all danger was over."

The *Times* correspondent at Amsterdam, writing on January 24th, says:—

"It is reported that 27 airmen, French and British, bombarded Ghent last week. Many important points in that district were hit."

On Monday the *Petit Parisien* published the following message from Salonika:—

"For three days there have been very active military movements both in the Monastir and Doiran directions. It is thought that the Germans are trying to efface the impression made by the aeroplane raids on Monastir, Doiran, and Ghevgheli."

FIGHTING THE FOKKERS.



IN the following despatch, written from the British General Headquarters, on January 21st, to the *Daily Chronicle*, Mr. Philip Gibbs gives a very vivid picture of the way in which the much-boomed Fokkers work and the methods of combating them:—

"The rather rapid succession of British aeroplanes brought down by the enemy during recent weeks has caused some anxiety, it seems, lest we should be losing our supremacy in the air. Stories

have appeared about the grave menace of a new type of German aeroplane—the Fokker—faster than any machine of ours, and very deadly as a fighting weapon. The idea that we have nothing equal to this appears—without further inquiry—to be supported by the number of casualties we have lately suffered. The most reassuring answer to all this is the exploit of one of our airmen, who, four days ago, on January 17th, attacked three of these Fokkers single-handed, and overpowered them.

"This very gallant aviator, who has had already a long list of successful achievements, was acting as escort to one of our other aeroplanes on reconnaissance duty when two Fokkers suddenly appeared behind that machine. Our pilot, who was 2,000 ft. above them, dived immediately, and, picking out one of the hostile craft, opened fire upon it with several rounds. It was forced down, and continued to nose-dive for at least 6,000 ft. By this time the second Fokker had climbed higher than his British adversary from behind, but our man chased up the sky and came to within 100 ft. of the German, when he opened fire again. After thirty rounds this machine made a steep nose-dive, followed down about 4,500 ft. by the British pilot, who saw him to earth at last in a ploughed field. Our pilot climbed again to about 11,000 ft., and discovered a German Albatros aloft, behind and above one of our scouts. It fled after a short encounter. But it was not the last adventure of the day, for on returning to our own lines the British pilot saw another Fokker amongst a little group of British biplanes on reconnaissance, like a wolf among the sheep. But the 'shepherd' scared it, and down went the third Fokker at a very steep angle, until it disappeared, still nose-diving, 3,000 ft. below.

"This success shows that the Fokker is not invincible. Undoubtedly, however, it is a dangerous opponent for any of our

reconnoitring machines. It has a pace of about 100 miles an hour, and a machine gun mounted forward firing through the propeller, so that in chase the pilot has a greater chance of accurate aim than one of our men in an ordinary type of army aeroplane designed for reconnaissance. A run of bad luck on our side following the sudden appearance of the Fokker machines over the German lines has, perhaps, over-emphasised the menace of the enemy's new type. It is purely a fighting machine, built exclusively for chase, and neither stable enough, nor able to carry enough petrol, for reconnaissance work. It lies in wait for our scouts coming over its lines, climbs very quickly, and then makes a hawk-like swoop, escaping back to its own lines if it meets with serious opposition.

"A difference in policy between the British and German air services accounts for the Fokker's successes, leaving the advantage still with us in the opinion of our air chiefs. For one German aeroplane which comes over our lines four British machines fly over theirs. As a daily routine our airmen reconnoitre the enemy's positions, bringing back useful information. It is a big risk, but one which our generals consider worth while. The German policy is not so courageous. Their observation for artillery work is done mainly above their own lines. In spite of their extreme hatred of our squadron raids and bombing expeditions they keep their men more at home. For this reason our men have fewer chances of chase within their own frontiers.

"It seems probable that our policy will not be altered. The results of the continual reconnaissance are considered too valuable to abandon, and the only question is to find methods of defence against the fighting Fokker. It is revealing no secret—because the enemy has already discovered it to its cost—that we now have a machine which is a match in speed and hunting qualities for the German type. Like that, it is designed specially for air combats, and carries its gun forward, so that it can fire straight ahead. That is all I say about it, though I studied its detail to-day with extreme interest. The proof of its efficiency is shown clearly enough by the splendid achievement I have already recorded above, when three of the Fokkers were brought down by a single British airman on our new type. Apart from that, the Fokker has often been challenged and beaten by our aviators on the ordinary reconnoitring machines. On 17th January one of our pilots sighted a Fokker biplane flying over a wood at 10,000 ft., pounced upon

him from 12,000 ft., overhauled him, and opened fire at close range. After some manoeuvring a jet of flame was seen to come from the enemy's machine, and the Fokker dived steeply.

"On the same day a pilot on escort duty saw his reconnaissance machine attacked by a Fokker. With another British aeroplane in support he dived at it and drove it off, and it was last seen going down in a spiral. On the homeward journey one of our aeroplanes was attacked by another Fokker, but it beat a hasty retreat when the British pilot opened fire.

"Again on January 17th, two pilots on escort duty with bombing

The Raids on Paris.

AFTER an immunity from raids for ten months, Paris was visited by a Zeppelin on Saturday night, about ten o'clock 13 bombs being dropped in a working-class suburb, resulting in nine houses being wrecked, 25 people killed and 27 injured. The Zeppelin was sighted at 9.20 p.m. at La Ferté Milon, on the Durcq, 40 miles north-east of Paris, and it apparently followed the Marne Valley. The night was still and fine but very misty, and the aviators who rose in pursuit stated that the airship kept at an altitude of 12,000 ft. Owing to the mist, therefore, the searchlights were unable to locate the airship. The bombardment only lasted a few minutes, and according to one report, the bombs were dropped so rapidly that two hit one house. The tunnel of the underground railway was pierced in one place, the explosion just missing a train which had passed a few seconds previously.

The *Daily Telegraph* Paris correspondent writing on Sunday night said:—

"At Le Bourget Aviation Camp, which is entrusted with the aerial defence of Paris, it is stated that the raid took no one by surprise. For aerial defence the Paris district is divided into a certain number of segments, and each was regularly patrolled by aviators last night, as every night. Among the thirty aviators who rose to pursue the Zeppelin, five saw it precisely, because it remained in their segment. What saved the Zeppelin was the thick haze. "This hampered us terribly," said one aviator. "At five hundred yards height I could no longer even see the searchlights, and for myself, in spite of my head light, I could not see ten yards ahead while flying."

According to the *Matin* one pilot chased the Zeppelin for fifty-three minutes, and attacked it with machine-gun fire at a range varying between 50 and 100 yards. He was fired at with several machine guns from the airship.

The Paris Municipal Council has decided to open a credit of 20,000 f. for the relief of sufferers, and part of the famous Père Lachaise Cemetery will be set apart for the burial of the victims.

Later messages state that the death-roll is increased to 29 and the number of injured to 30.

On Sunday night there was another raid, about the same time, and some thirty bombs were dropped on the northern outskirts of the capital. Most of the bombs were of the incendiary type, and only slight material damage was done. According to a Reuter message from Paris, one of the unexploded bombs weighed 103 kilos. (just over 2 cwt.), another 65 kilos., and a third 57 kilos.; on examination it is said that they were all found to be charged with trinitrotoluol.

It is reported from Rotterdam that travellers arriving from

machines were waiting for two laggards when they were attacked from above and behind by a single-seater Fokker. The pilot was in a standing position, and fired through his propeller, opening with a burst at forty yards. Our pilot turned and opened fire with half a drum from the Lewis gun. The German flew round and attacked again. Our men gave him another half a drum, and the pilot of the hostile machine appeared to be hit, and he dived and was lost to sight. Beyond any question at all the damage inflicted on the enemy by our air service is greater above all comparison than the injury they do to us."

Germany state that there were rejoicings in Berlin over the raid on Paris. The *Daily Mail* Rotterdam correspondent reports that Zeppelins have been active in Belgium for more than a week, and he learnt that the trips were chiefly experimental trips by new craft.

One result of the raids on Paris has been a great cry for reprisals on German towns.

Bank Clerk and a Zeppelin.

At the annual meeting of the London County and Westminster Bank, last week, it was mentioned that one of their clerks, Mr. F. F. Morgan, laid the gun which crippled the Zeppelin raider, subsequently destroyed at Ostend. Mr. Morgan joined the Anti-Aircraft Corps, and subsequently transferred to the Royal Naval Reserve, and it was while serving on a patrol boat that he was instrumental in damaging the Zeppelin, one shot taking effect in the tail and another in the forepart of the airship. His section had received the thanks of the Admiralty.

A Zeppelin Over Danish Territory.

MESSAGES received in Copenhagen from Malmoe, Sweden, on Sunday last state that a Zeppelin was twice observed on the evening of January 28th passing over the island of Gothland with searchlights. The *Nyköbing Dagblad* states that similar observations were made at the same time from the southern Danish islands, where German airships were seen passing over neutral territory.

Dutch Fire on Zeppelin.

INFORMATION was received in Amsterdam on January 27th to the effect that on the previous day a Zeppelin was sighted over the northern part of Belgium manoeuvring along the Dutch-Belgian frontier. Dutch soldiers fired at the airship, which returned over the frontier, and left in the direction of Bruges, apparently not damaged.

Airship Wreckage off Norway.

ACCORDING to reports, of Norwegian origin, circulating in Copenhagen, among the large number of mines washed ashore lately along the coast between the Christiania Fjord and the Swedish border are some large aircraft bombs, measuring 2 ft. in diameter. Quantities of wreckage, indicating the recent destruction in this vicinity of one or more airships, are also reported to have been found. Torpedo boats and coastguards are removing the bombs and mines. A close investigation is being made by the authorities.

Lieut. Boehme Killed.

FROM the "wireless" news sent out from Berlin on Jan. 26th:—The German Aviation Branch takes this opportunity of expressing its regret at the loss of Lieut. Boehme, who was cited several times in the Main Headquarters report. Lieut. Boehme fell down with his machine at Emsheim, in Alsace, and was killed immediately.



"Life is a mirror—smile at it and it will smile back; frown at it and it will frown again."

Citing a Case.

"WORK as we will, we can't excel nature."

"Oh, I don't know. A monoplane can fly upside down. Ever see a bird do that?"

It happened during one of the air raids, at a place not specified in the newspaper reports. Mosesstein, just emerging from a chemist's shop, got in the way of the explosion, and when he recovered in the hospital found that both his feet had been amputated. "Just my luck," he grumbled; "and I had just vent and bought six-pennyworth of corn plaster."

NOTHING like a vigorous anti-Zeptic treatment to free the air from Germs.

As there is nothing like publicity for securing reforms, our air policy can probably do with a lot of Billing. — *Whipped Topics*.

AN officer of the Royal Flying Corps, while at home on leave from the front, was invited to join a party for a couple of days' shooting in the country. "Oh, no, no, thanks," he replied with emphasis, "I've not the heart for it. I've been the blooming bird myself." — *News of the World*.

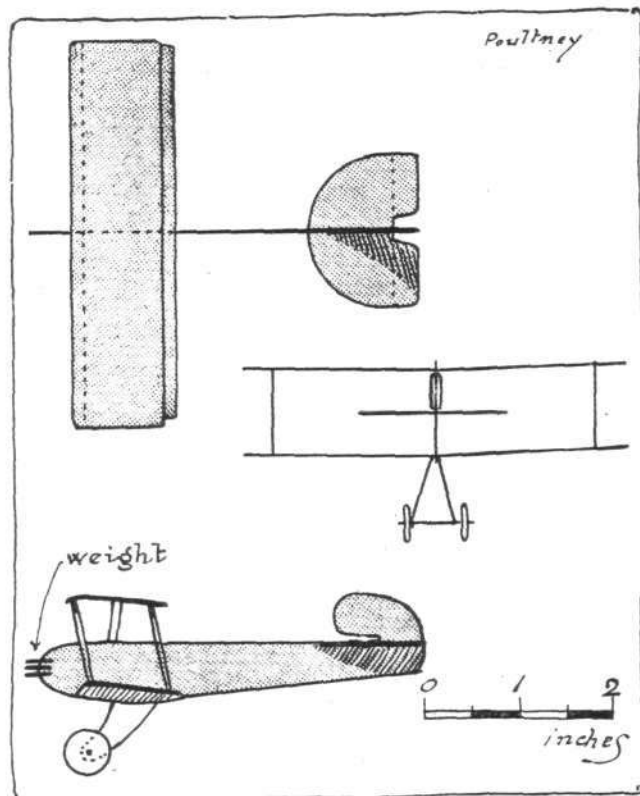
Models

ALL communications in connection with this section should be addressed to the Model Editor, "FLIGHT," 44, St. Martin's Lane, London, W.C. Correspondents are requested to write on one side of the paper only.

Paddington and Districts Aero Club and Scale Models. Mr. W. E. EVANS, the hon. secretary of the above club, writes that his committee have recently passed a rule limiting their competitions to scale models, and it is hoped that those aeromodellists in and around London who are specially interested in scientific model flying will be induced to join, and thus lend their aid in the work which the club has set out to do. The entrance fee and the subscription are both moderate, and members have no entrance fee to pay in club competitions, for which it is intended to put up some substantial prizes. Members have the use of a private ground about 80 acres in extent, free of trees, the club being indebted for this privilege to its president, Mr. A. W. Perkin, J.P. The club has also a useful little library.

A Biplane Paper Glider.

Mr. Percy J. Poultney sends along the accompanying sketch of a paper model glider with which he has made some successful experiments, and which should prove of assistance to others who

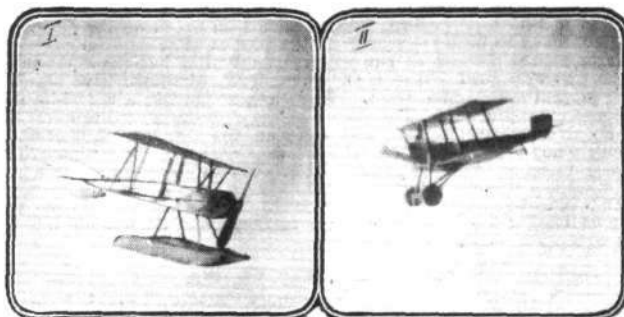


may be working with paper models. Mr. Poultney states that when launched his model will glide the distance of 30 yards, gracefully land, run along with the tail up, and then drop.

The Public Interest in Models.

Mr. Claude Lander writes the following:—
"Having read with interest the contribution of Mr. Evans in your issue of December 31st, and having myself been an enthusiast since the days when the late Mr. H. Latham made his attempt at Channel flying, I think it is not so much due to models being flying sticks, a type of model that never found favour with me, that this interest is lacking, but that flights are covered up in the manner of speaking. For example, at Balham we have use of three public commons, but one must not use them for model flying after 10 a.m. If they could be used for flying in the afternoon, one would be sure to have 'some crowd' during the spring and summer months. I have attempted to do so myself in the pre-war days, and after having fellows and girls stop playing tennis to see the models fly have had to disappoint them as the common authorities would intervene and prohibit same. If a certain part of a common or other public ground could be reserved for model flying, I am sure the public interest would make a great change, more so after the

present war, and then an active and *unbiased* model club would sure to be able to obtain members, and then lay its own rules as to



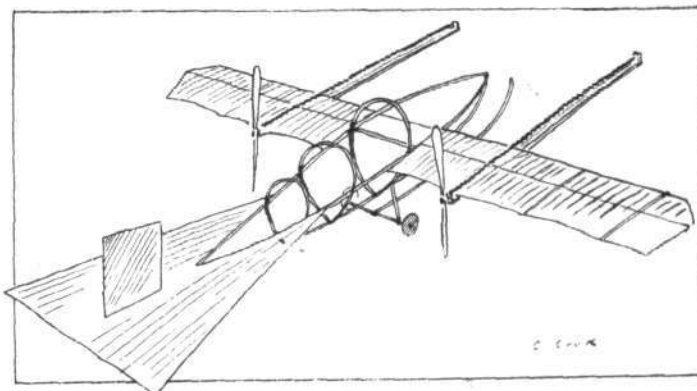
TWO SCALE MODELS IN PAPER.—On the left the Grahame-White tractor seaplane, and on the right the Ponnier Scout.

sticks or scale models. At present it is, I think, the public interest in model flying that we want, also your excellent paper being reduced to a penny number is sure to more than help in doing this."

Paper Models and a Twin pusher Monoplane.

In sending along the accompanying photos. and sketch, Mr. Cecil B. Cook says:—

"I enclose photographs of two models: No. I, Grabame-White circuit tractor; No. II, Ponnier Scout, built from the drawings which have appeared in 'FLIGHT' (valuable paper). The materials used are: Paper; for wings and body thin strips of wood



A twin pusher monoplane model by Mr. Cecil B. Cook.

(from Jap. lamp shades); cork for wheels; wire for axles of wheels and propellers. (No. I has paper floats.) Both are the same size as the drawings, and are fairly good gliders.

"I am now building a model like a Mann biplane, only mine is a mono. with propellers behind the front wing. The general arrangement is shown in the sketch herewith."

AFFILIATED MODEL CLUBS DIARY AND REPORTS.

Club reports of chief work done are published monthly. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

South-Western Aero Club (373, BRIXTON ROAD, S.W.).

Monthly Report.—Last month marked the appearance of two new models—a small Scout biplane by Mr. Howse, and a small tractor monoplane by Mr. Prodger. Mr. Reid's pusher monoplane was out several times. This model has got rid of several of its little peculiarities and promises to fly very well. It already has a greater degree of stability than the tractor, which has also been out flying by Mr. Reid during the last few weeks. On the 29th a flying meeting was held, Mr. Prodger's tractor mono. flying steadily, with flights of over 20 seconds. This performance is quite good considering that the model is only about 20 ins. long. Other dimensions are: Span, 27 ins.; propeller, 9 ins. diameter; weight, 4 oz. Mr. Reid's pusher mono. was also out flying well, but

it was suffering from very inefficient running gear, which invariably upset the landing. Mr. Howse's Scout biplane made its first appearance. This model is extremely well made, but was considerably over-elevated, and requires a good deal of readjustment, as well as new running gear. Altogether, the month's flying has been excellent, considering the small membership. Indoor work is not suffering, and there are indications of one or two new machines making an appearance in the next few weeks.

UNAFFILIATED CLUBS.

Finsbury Park and District (66, ELFORT ROAD, Highbury, N.).

Monthly Report.—The past month has been fairly busy with regard to construction and flying done, members being out on all Saturdays on practice work. Mr. Richards has evolved a twin pusher mono. with tail (after the style of the Mann biplane) which has shown itself exceptionally stable in even high winds; the same member has also been doing much good flying with a tractor mono. of pleasing design. Mr. F. Rayner and B. H. Barnard have been putting up good flights with Morane type monos. A light-weight electric light attachment, designed by Mr. Barnard, has been fitted on his mono. for illuminated flights and flown at dusk; naturally at the present time experiments of this kind cannot be performed as late as one would wish, but the effect in the twilight was very good. Messrs. O. Hex and W. Hardinge have also been putting in good work, while Mr. H. Mullin has, at present, a record-breaking mono. under construction. The future of the club during the war has been receiving anxious consideration, and a scheme has now been drafted by the secretary which meets with universal approval. The financial position, too, is now very strong, and it is not considered necessary to levy "subs." during 1916 at least, while a reserve has been provided to carry forward until after the war. The club is to be congratulated on its ability to "carry on" during these strenuous times, and it is hoped that the termination of the war will find it in as strong a position as its commencement.

Liverpool Aero Research Club (147, OLIVIA STREET, BOOTLE)

Monthly Report.—January has been a quiet month, and with the exception of work by T. W. Bennett little of mention. This member has now in workshop a very fine negative tip incidence covered-in fuselage tractor r.o.g. mono., and a very fine and original r.o.g. twin-lifting tail mono. The secretarial change should be noted owing to the calling to the colours of the secretary, G. H. Kishaw, who is now serving with the 16th K.L.R. at Whitechurch. B. Tear is also likely to be called away shortly with the Transport Corps. The present hon. sec. is T. W. Bennett. The club's "Roll of Honour" is a credit to the members.



Punjab's Gift of Aeroplanes.

THE *Daily Telegraph's* correspondent at Calcutta, writing on Monday, stated that the fund organised in the Punjab for the purchase of an air fleet as a gift to the Empire has reached nearly £60,000.

Another Aeroplane from Ashanti.

A FIFTH aeroplane has now been presented to the Royal Flying Corps by the people of the Gold Coast and its dependencies, the inhabitants of Ashanti having subscribed a further sum of £1,526 to the Overseas Aircraft Fund.

Naval Flyer's Escape.

IN connection with the official announcement in our last issue that Flight-Lieut. J. B. P. Ferrand, D.S.O., had returned to duty after being missing for two days, it is stated he went up from Nieuport on the morning of the 23rd inst. to make a reconnaissance. He experienced some engine trouble about midday, and was obliged to make a descent on the sea. He managed to keep afloat until the evening of the next day, when he was fortunately rescued by a Danish steamer and taken to Ramsgate.

Award for Clever Captain.

RECOGNITION of the clever seamanship of Capt. J. Goodson in navigating the steamer "Balgownie," of the General Steam Navigation Co., so as to elude three German flying machines was made at the Chamber of Shipping on January 18th, when the President, Sir Kenneth Anderson, presented the captain with 100 guineas from the War Risks Association. It was announced that the directors of the G.S.N. Co. had voted a similar amount for distribution among the crew. The incident took place on November 27th when the ship was near the Hinder light on her way to Rotterdam. Three flying machines attacked the vessel, but none of the 23 bombs dropped fell on the deck, although one was so close that the explosion caused a heavy sea to fall on the after-deck. Two of the machines then flew round the vessel firing their machine guns, but fortunately no one was hit. Throughout the attack, which lasted twenty minutes, the ship was kept at full speed on a zig-zag course. The only weapons of offence were one rifle and the ship's distress rockets, of which the fullest use was made. The Admiralty had written that Captain Goodson and his crew had displayed "great coolness and determination," and had requested that the company would convey the appreciation of their lordships of "their sturdy conduct, which resulted in saving their ship."

If you require anything pertaining to aviation, study "FLIGHT'S" Index to Advertisers and "FLIGHT'S" Buyers' Guide and Trade Directory, which appear alternately in these pages—one each week.

German Air Attacks on Shipping.

AN attack by German aviators on the Wilson liner "Carlo" was described on the 28th ult. at Hull by Captain Cawcutt and Chief Officer Payne. The vessel was on her way from the Mediterranean on the 26th ult., and had picked up the Dover pilot, when, shortly after she passed the Gull light, at 3.15 p.m., she was attacked by an aeroplane which dropped six bombs, all of which fell clear of the "Carlo." The vessel was immediately put on a zigzag course, and successfully evaded the attack.

The aeroplane then turned on a westerly course and dropped four bombs among the ships anchored in the Downs, but without causing any damage. The machine went off eastwards at high speed at 3.30. Chief Officer Payne said the bombs exploded as they reached the sea, and displaced such a mass of water that the ship was thrown on her beam-ends. They could not hear the engines of the aeroplane.

German Story of Aerial Fight.

IN the "Wireless" news sent out from Berlin on January 31st the following appeared:—

"A most interesting air fight on the Western front is described in the *Lokalanzeiger* by an eye-witness. Two enemy battle aeroplanes, subjected to the fire of the German artillery, attempted to escape, but only one succeeded. Suddenly a small German battle monoplane appeared, which attacked the enemy at a height of 3,000 ft. After an exciting combat, fought by both with equal bravery, the German aeroplane, attacking from the front, forced the enemy to land. The German machine also landed, and its pilot rushed to the British aeroplane, and shook hands with both the British officers, who were wounded, the pilot slightly on the head, and the observer three times in the left shoulder. The British pilot, who spoke German fluently, declared, after realising that he was a prisoner: 'I am not ashamed, since Immelman has defeated us.' Whereupon the German replied: 'Well, this time it is only Boelke.'"

To Aviation Accessory Makers.

MESSRS. BROWN BROTHERS, LTD., of Great Eastern Street, London, E.C., are busy compiling a catalogue of aviation accessories, and manufacturers of these goods are invited to send particulars of new lines they would like inserted. Particulars should be addressed to Department 41a.

Collier Trophy Awarded to Burgess.

THE Collier Trophy awarded "for the greatest achievement in aviation in America, the value of which has been thoroughly demonstrated by use during the preceding year," has been awarded to Mr. W. Starling-Burgess for his development and demonstration of the Burgess-Dunne hydro-aeroplane during 1915.

The Winner of the Curtiss Trophy.

IT has been announced that, pending official confirmation of the distance, the winner of the Curtiss Marine Flying Trophy for 1915 is Oscar A. Brindley, who made a flight of over 510 miles.

A New American Prize.

AT the second Pan-American Congress, recently held, the Aero Club of America, through the Brazilian Ambassador, offered a \$5,000 Aviation Trophy, and \$5,000 in cash to be competed for annually between the representatives of the countries of the Western Hemisphere, the first competition to be held at Rio de Janeiro as soon as possible. The following competitions may be held in the countries represented by the successive winners.

In offering the prize, the Aero Club of America states that it wishes to assist in hastening the coming of the day when we may travel in the air from Rio de Janeiro to New York and *vice versa*, making the trip in a few days, and to bring the people of this continent into closer relation through sport.



Index and Title Page for Vol. VII.

The 8-page Index for Vol. VII of "FLIGHT" (January to December, 1915) is now ready, and can be had from the Publishers, 44, St. Martin's Lane, London, W.C., price 6d. per copy, post free.

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